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University of Nebraska-Lincoln

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“INTERPRETING A DIVIDE”

KURT CISAR



UNIVERSITY OF NEBRASKA
MASTERS OF ARCHITECTURE
MARK HOISTAD
MAY 2005
LINCOLN, NEBRASKA

PROJECT STUDY DIRECTION:

THE FOLLOWING PAGES CONTAIN THE **ORIGINAL THESIS PROPOSAL** SUBMITTED IN THE SPRING OF 2004.

“INTERPRETING A DIVIDE”

DEVELOPING AN INTERPRETIVE CENTER ALONG
THE CONTINENTAL DIVIDE

P r o j e c t D e s c r i p t i o n :

The proposed design project entails combining the arts and sciences to create an Interpretive Center that also serves as a short term residence for artists. The intention is to generate a building that exhibits an expression of its adaptability to climactic conditions and plays an interactive role in how one perceives the surrounding environment. The connection of both art and science will allow for the building to become a viewing device that will adapt to the site's multiple elements in a manner that can induce a clear educational environment. The design as viewing device will be used as a visual datum as to heighten the awareness of both art and science as well as the ecosystem of the surrounding site. The building will become a source of new scientific studies and also will encourage artists to interpret the site and its surroundings.

The buildings predominant role will be as an Interpretive Center, while still containing space for artists to develop work and also for scientific studies of the surrounding ecosystem. The molding of the artistic and scientific work will permit for a unique translation of information that will allow for all types of visitors to learn about the area and its natural tendencies. In doing so, the building will also require the use of gallery spaces, a lecture hall, gift shop, lab areas, and space for educational displays. The total building area can be approximated at around 20,000 square feet, with possible detached residential units surrounding the area.

S i t e D e s c r i p t i o n :

The chosen site for the Interpretive Center is within Rocky Mountain National Park (RMNP) within the state of Colorado . RMNP is home to the highest continually paved highway in the United States, peaking at 12,100 feet above sea level. The Continental Divide also runs through the park dividing the Rocky Mountains into two diverse ecosystems. The site chosen is located off the two lane highway in an area named Milner pass, at an elevation of 10,759 feet (see maps on page vi). The building will reside on the edge of Poudre Lake, the headwater for the Poudre River. The lake lies at the base of the Continental Divide and is created and supplied by annual snowmelt from the surrounding mountains. Since the site is below tundra and on the western edge of the mountain range, the site does not receive as much snow and torrent weather as does the higher elevations and eastern portions of the mountain range; although the highway does close during most winter months due to heavy snow fall. In reaction to the heavy amounts of snow, the design will have to close for most of the winter months due to the highway closing.

The location provides a unique opportunity to develop an architectural expression that can incorporate art and science in a manner that enables a complete understanding of the ecosystem of which it resides. Since the site is located less than one-thousand feet below tundra, weather extremes will become a factor that will affect the overall design and function of the building. It falls in an ecosystem named the 'sub-alpine,' which is known as an intermediate ecosystem. Many mammals pass through this area before the winter months, as to get away from the harsh winters of the upper elevations. While some animals leave, many stay and have adapted over time to endure the change in climate. The design will take influence from the surrounding ecosystem in a manner that will enable itself to successfully adapt in accordance to the seasonal changes. The site also will allow itself to become a canvas of inspiration for the artists. The architecture itself needs to react to the site in manner that fits into the existing ecosystem as does the surrounding wildlife. Such reaction will be achieved by the design having the capabilities of adapting itself throughout the seasons and also having the correct balance of interaction with both its users and the site.

As previously stated, the intention of this project is to generate a building that exhibits an expression of its adaptability to climactic conditions and plays an interactive role in how one perceives the surrounding environment. The Interpretive Center seeks to provide a place for the public to visit and learn about the intriguing environment where the building exists. The site itself presents multiple formal and programmatic design challenges as does the interaction involved between a nature center, its users, and visitors. There are two main issues that will be faced in achieving this building type. The first will be formal **adaptation**, the other **interaction**. Each will be explained in more detail in the following text.

ADAPTATION: Since the site is located at an elevation of 10,759 feet, harsh seasonal changes cause the surrounding ecosystems to become adaptable. The study of local flora and fauna will allow for an understanding to develop concerning the types of changes they go through to handle the winter conditions. The knowledge gained from these steps will allow for base from which to start looking towards the buildings adaptability. The building itself must become adaptable in a way that will allow for itself to withstand the seasonal conditions brought upon by the mountainous climate. The building has the opportunity to respond to the site conditions in many ways, listed below are considerations for the project that will be examined:

1. The building takes a structural route, whereas it is designed to withstand the climate changes that the winter season brings to the site (wind, snow, ice, etc). *mountain goats*
2. The design itself changes throughout the seasons to adapt to the different climate. The design would slowly shut down according to climactic changes. *snowshoe hare*
3. The building could have the ability to be partially broken down; these parts then could be stored on site for later re-construction. *black bears*
4. The design might also have the ability to be broken down and taken off site until the weather suffices for re-construction. *deer / elk*

The decision will be based upon the studies of local plant and animal life and their responses to climactic changes. It is also possible that the outcome could become a hybrid of the listings above. It will be essential that the building performs its main function, an interpretive nature center, at all possible times throughout the year.

INTERACTION: The design will become a viewing device in which the building itself, its form and its nature, are generated as a direct response to making one attuned to specific surrounding factors (i.e. climate, mountain formations, water formations, etc.). The architecture must, with its presence, give users a better grasp of the landscape that it is surrounded by. The architecture itself must interact in a way that will heighten the awareness of the site in order to successfully become a space for continuing research, creativity, and education. This can be achieved by either of the following:

1. Capture formal cues from the current landscape an fully integrate the building into the site mimicking that of what is already present. Allowing for little distraction from the natural landscape.
2. The building takes on characteristics of that blend well with the site, only in the manner that the building becomes strictly a viewing device.

The second solution would allow for more freedom of formal design, allowing for a more inspirational type of Center. The building will probably take on aspects of both situations as to detract as little as possible from the natural beauty of the site. The idea is to enhance the beauty, and create a heightened state of interaction by the intervention of the Interpretive Center. Interaction will have to be studied also in terms of physical adjacencies of program (arts/sciences). This will be important in that the creativity of the artists be related in some way to the studied landscape that the building exists within. Interaction between the lab areas and studios will have to be studied in order to find a balance so that creativity is aided by the architecture not hindered.

The overall successfulness of the project will rely on the execution of both formal adaptation and interaction. Creating a building that is able to survive the climactic changes that the current ecosystem endures as well as enhancing user interaction will enable the building to become an integral piece to the landscape.

The design process for the Interpretive Center will entail the investigation of two major ideas. The first investigation will be the complete understanding of adaptation and how it can affect the program. The second is to develop a definition of interaction that will allow the building to function properly as a form. These two directions will be explained in terms of further investigations below:

Research the Implications of **ADAPTATION** (as defined by Oxford):

-What is needed that can inform building design?

- *Investigation of Site*

- Obtain weather information from the National Parks Service (i.e. precipitation amounts, temperatures, wind, etc.)

Specifically looking for extremes, as to inform the correct adaptability for the winters.

- Obtain topographical and USGS data from the National Parks Service (NPS).

Define and highlight the sub-alpine ecosystem, and the area it covers surrounding the chosen site.

Find a portion of land that is sufficient for the size of program that surrounds the Poudre Lake within Milner Pass.

- Photo Document the site through seasonal changes and/or possibly attain photos from the NPS.

After defining a specific site location, photo-document the area at both its normalcy and its extreme, if attainable by the NPS.

- *Investigation of the Surrounding Ecosystems*

- Research both local flora and fauna as recognized by the Parks Service as living within the sub-alpine ecosystem.

Document the process each animal and plant goes through within a given year. Show images of each stage and document the findings.

Develop a list of possible applications that can be learned architecturally, or that can be applied to achieve formal adaptability.

- Research the natural boundary line of the Continental Divide.

Document with photos, show the ridge line that the Continental Divide follows from north to south, passing directly through the site. Also obtain aerial maps of the beginning and end of the Divide.

Find exactly where the divide cuts through the immediate area as to inform the buildings possible dominant orientation.

Library research pertaining to the Continental Divide's creation and overall implications to the sub-alpine ecosystem.

- *Research Precedents (study ways to adapt)*

- As stated above, research the process all flora and fauna native to the sub-alpine ecosystem.

Develop and document possible applications to formal architecture.

- Research other vernacular architecture – through means of library research

Look at architecture that is located in high altitudes

Research architecture that is designed to adapt to climactic changes, specifically harsh winters and excessive precipitation.

Develop possible reactions the building can take in order to combat the harsh winters and excessive precipitation according to research found.

- Research high altitude housing and/or mountainous communities (through library and NPS)
Find consistencies that can be documented and applied to possibly inform building formal qualities.

Research the Implications of **INTERACTION** (as defined by Oxford):

-What is needed that can inform building design and function?

- *Investigation of Site*

- Examine site characteristics to aid in heightening the importance of the building as being a viewing device.
Highlight major intersections (i.e. Continental Divide and other natural formations), and other dominant natural formations.
- Examine topographical information to find the best area for the location of the building to increase its interaction with its surroundings and its visitors.
Designate multiple zones where the structure could possibly be set in order to link itself with its surroundings.
Diagram each possibility to find the best area for the chosen type of interaction.

- *Research Precedents (study building types that induce interaction)*

- Contact the NPS for current nature centers located throughout other National Parks, with a focus on examples that are located in mountainous regions.
Diagram positives and negative design issues according to user interaction.
- Examine other building types such as museums, theatres, stadiums, etc., and develop a description based on different types of interaction.
Diagram and relate possible influences that these can have on small scale construction such as the Interpretive Center.
- Research different live/work situations in architecture.
Develop a listing of other situations where this idea has been applied and whether the same principles can be used in the design of this project.

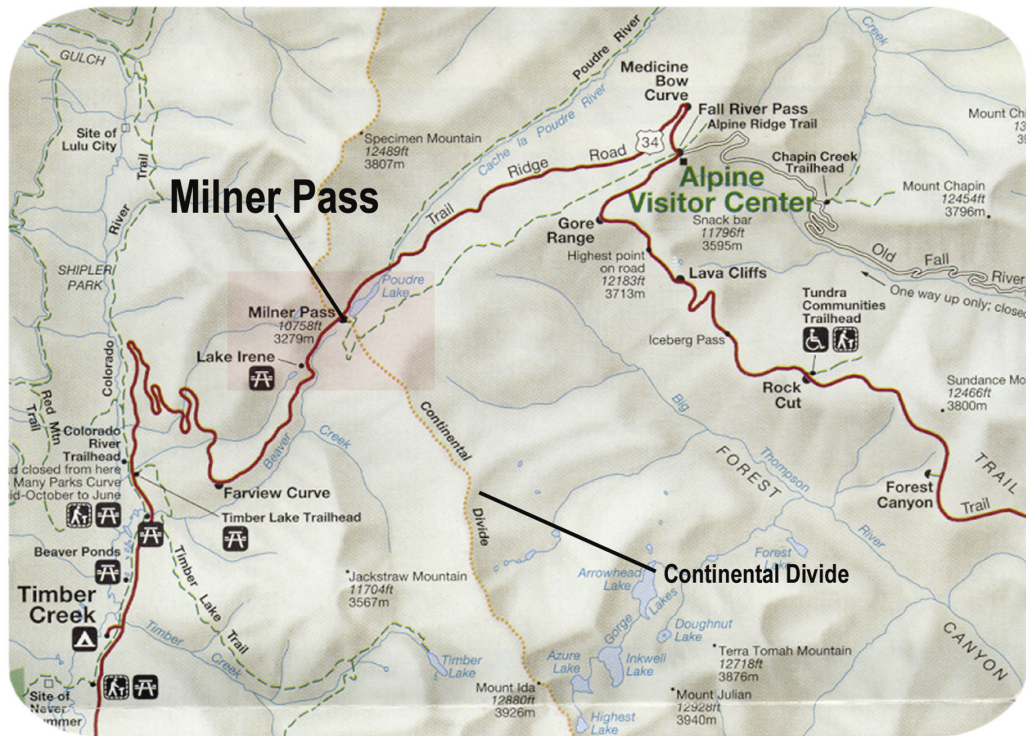
- *Understanding an Art and Science Interaction*

- Obtain information on current artists that have visited the park, and how they live and work.
Research and document the current program that the park runs every summer. How long does it last? Who is invited? What do they produce? What happens to their work?
Photo document the existing housing that the artists live in while working for the park for the summer.
Research programs within the park that do scientific studies on a continual basis that could be housed in this design.
- Develop a system of interaction that will allow scientific information to be explained in terms of art as well as science.
Research art types such as painting, sculpture, music, etc., and determine the ways they can each be used in terms of education. How have other Interpretive Centers displayed information regarding nature?
Develop a program for what the Interpretive Center will be used for. What will it teach visitors? What is it they need to understand about the surrounding ecosystem?
- Develop a proper live/work relationship for visiting artists and scientists.

After successfully coming to a clear understanding of how interaction and adaptation can be used within the architecture, the design process will move into a formal exploration stage. The information found through all research listed above, when finished, will give a direction formally to the project. This information will constantly be brought into each design phase following. The project will continue to develop until the design of construction details is thoroughly designed and understood.



Overall Park Map - RMNP. Courtesy of National Parks Service. 1998.



Overall Park Map - highlighting the Milner Pass area. Courtesy of National Parks Service. 1998.

NAAB CRITERIA

I attend to adhere, and to develop a comprehensive understanding of all the minimum criteria stated by the NAAB. Criteria in **RED** are additions to minimum. These additions are being added in order to develop a complete understanding of the design from the early stages to construction details. Criteria in **GREY** are extensions from Arch 613 to Arch 614, these criterion overlap into both semesters of development. Lastly, criteria expressed in *ITALICS* will entail further emphasis in order to develop a complete understanding of that specific area of design. These criteria include Human Behavior (7), Precedence (9), Building System Integration (22), and Technical Documentation (28). Both 7 and 9 will be imperative to an understanding of how the site will affect the design and how the design will interact with visitors. While 22 and 28 will allow for a complete understanding of the building and how it affects the site and deals with the extreme natural factors it faces.

ARCH 613

1. VERBAL AND WRITING SKILLS:
 - achieved by researching and developing issues concerning construction or design theories that can apply formally and programmatically to the overall understanding of the project. A program statement and analysis will be properly documented in the early stages of development and dialogue with a mentor will be planned throughout all stages of research and development.
2. GRAPHIC SKILLS:
 - achieved by creating both physical and computer models, as well as display boards, that will effectively be able to demonstrate clear thoughts and ideas throughout each design stage.
3. RESEARCH SKILLS:
 - achieved by gathering all site information attainable through the National Parks Service and self documentation while visiting the site, as well as library research pertaining to the study of the ecological adaptations and visitor interaction. High-Altitude design will also be studied as a building typology to be used for precedence.
4. CRITICAL THINKING SKILLS:
 - achieved by applying researched materials and gathered site information to begin informing preliminary design decisions and also extending into building construction ideas. Early stages of design will rely heavily on the application of information found within the research stages.
5. FUNDAMENTAL DESIGN SKILLS:
 - since building size will be of a smaller scale, the project will allow for an intense analysis of construction and building details as well as the application of basic design theories.

7. HUMAN BEHAVIOR:

-achieved through proper investigation of site. Analysis of how the site is currently used and how the proposed program will affect (or should affect) the site in the future will be studied. Proper engagement of the design by pedestrian movement and viewing will be studied in an effort to create a proper educational facility.

9. USE OF PRECEDENTS:

-achieved by researching building types that reside at high altitudes, and how they handle extreme weather conditions as well as how other buildings prepare themselves for hibernation in the winter. Researching the interpretive center as a building type will inform possible qualities in the design; also, high-altitude construction will be researched as another form of precedence.

15. SITE CONDITIONS:

-achieved by studying the effects of the Continental Divide and determining the reaction the building will take to its threshold. The design will also develop an adaptive nature allowing it to manipulate itself in accordance to the season. Also, involve the physical aspects of high altitude construction, and the interaction of people with the building and site.

16. FORMAL ORDERING SYSTEMS:

-achieved after research stage is completed and begins to inform a direction of thought and design that will continually be challenged and defined by research and site context.

30. PROGRAM PREPARATION:

- A thorough program statement of intentions will be formalized and followed as to keep the project within the stated trajectory. All relevant codes and laws will be researched as well as stipulations that the National Parks Service might have towards construction.

ARCH 614

1. VERBAL AND WRITING SKILLS:

- achieved by researching and developing issues concerning construction or design theories that can apply formally and programmatically to the overall understanding of the project. A program statement and analysis will be properly documented in the early stages of development and dialogue with a mentor will be planned throughout all stages of research and development.

2. **GRAPHIC SKILLS:**
 - achieved by creating both physical and computer models, as well as display boards, that will effectively be able to demonstrate clear thoughts and ideas throughout each design stage.
4. **CRITICAL THINKING SKILLS:**
 - achieved by applying researched materials and gathered site information to begin informing preliminary design decisions and also extending into building construction ideas. Early stages of design will rely heavily on the application of information found within the research stages of development.
5. **FUNDAMENTAL DESIGN SKILLS:**
 - since building size will be of a smaller scale, the project will allow for an intense analysis of construction and building details as well as the application of basic design theories.
13. **ENVIRONMENTAL CONSERVATION:**
 - achieved by recognizing and designing for formal and programmatic attributes of the building to be conscious of its delicate surroundings
14. **ACCESSIBILITY:**
 - achieved by allowing for sufficient areas for the aid of people with physical disabilities, such as boardwalks, ramps, and sitting areas.
15. **SITE CONDITIONS:**
 - achieved by studying the effects of the Continental Divide and determining the reaction the building will take to its threshold. The design will also develop an adaptive nature allowing it to manipulate itself in accordance to the season. Also, involve the physical aspects of high altitude construction, and the interaction of people with the building and site.
16. **FORMAL ORDERING SYSTEMS:**
 - achieved after research stage is completed and begins to inform a direction of thought and design that will continually be challenged and defined by research and site context.
22. **BUILDING SYSTEM INTEGRATION:**
 - the design and integration of building systems will be incorporated into every stage of the design as to create a complete functioning building that will be environmentally conscious of its surroundings.
27. **DETAILED DESIGN DEVELOPMENT:**
 - the building size (as stated in the program) lends itself the ability to detail many areas within the design. Attention to physical construction and how it works in conjunction with the design theory will be evaluated at every stage.

28. TECHNICAL DOCUMENTATION:

-within the last stages of the project a sufficient set of construction documented details will give appropriateness to the buildings design and construction.

29. COMPREHENSIVE DESIGN:

-achieved by creating a timeline of specific design requirements at each stage of work as well as meeting with my mentor on a consistent basis to ensure constant development of every idea within the project.



PROJECT ABSTRACT ————— **Proposal** iii - xiv
(ORIGINAL THESIS PROPOSAL)



INDEPENDENT STUDY **Adaptations** 2 - 15



PROGRAM ————— **Research** 16 - 62

INTRODUCTION	18 - 23
EXISTING CONDITIONS	24 - 30
SITE ANALYSIS	31 - 40
PROJECT SCOPE	41 - 62



CONCEPTUAL DESIGN & PROCESS ————— **Fall** 63 - 79

INTRODUCTION	64 - 65
PRESENTATION WORK	66 - 71
PROCESS & EXPLANATION	72 - 78
BLIND CRITIQUE COMMENTS	79



FINAL DESIGN & PROCESS ————— **Spring** 80 - 101

PRESENTATION	81-95
PROCESS & EXPLANATION // CLOSING	96 - 97
ADDITIONAL PROCESS	98 - 101

BIBLIOGRAPHY ————— 103 - 104

ACKNOWLEDGMENTS ————— 105

INDEPENDENT STUDY DIRECTION:

THE FOLLOWING PAGES INCLUDE WORK DONE PRIOR TO THE BEGINNING OF THE FALL SEMESTER OF 2004. THE WORK WAS DONE AS A PART OF AN INDEPENDENT STUDY, ITS FOCUS IS EXPLAINED BELOW.

*THE PROJECT PROPOSES TO STUDY LOCAL **FLORA** AND **FAUNA** AND ITS USE OF VARYING ADAPTIVE MECHANISMS THAT ALLOW EACH TO SUSTAIN THEMSELVES IN THE HARSH ECOSYSTEM WHERE THEY RESIDE. STUDIES WILL FIND INFORMATION SHOWING HOW EACH ADAPTS WITHIN ITS CONTEXT AS WELL AS HOW ITS MIGHT HAVE ADAPTED FROM OTHER REGIONS THROUGHOUT THE WORLD (HOW HAS IT EVOLVED SPECIFICALLY FROM ITS COUSINS?) AFTER THE GATHERING OF ALL INFORMATION, THE NEXT STEP REQUIRED ANALYZING THE INFORMATION AND DETERMINING HOW IT COULD AFFECT THE FORM AND FUNCTION OF THE INTERPRETIVE CENTER AS WELL AS THE SITE.*

Continental Divide Weather Conditions - - Mountains Creating Their Own Weather/ Weather Extremes Within the Sub-Alpine

Many of the characteristics of the species discussed throughout this paper have developed adaptations that are due to the climate and weather conditions of their surroundings. To fully understand the animals and plants within the local area of Milner Pass, it is important to have a grasp on why they have evolved the way that they did. So the introduction to this study will focus on current climactic patterns within the National Park as well as the Milner Pass area.

With highs in the summer averaging around 70 degrees F and in winter about 20 degrees F, normal conditions are not extremely intolerable. Although, it is the extremes that many species have adapted to over time in order to survive. Winter winds have been measured at upwards of 170 miles per hour (measured less than 2 miles from Milner Pass) (Wuerthner, 8). The U.S. Weather Bureau categorizes a hurricane as a tropical storm at wind speeds of 70 mile per hour. Hurricane force winds are a regular feature at upper elevations of Rocky Mountain National Park. Temperatures as low as -41 degrees F have also been recorded at the base of RMNP (Rocky Mountain National Park). When you mix the winds and temperature with the large amounts of precipitation that the area commonly sees, it can create some very harsh conditions. Conditions are the worst in the winters for animals and plants although there can be unfavorable weather in the summer as well.

Even though summers are very sunny, at least 80 percent of summer days receive some cloud cover due to convective storms. A typical summer day starts out cloudless, but as the nearby plains heat up, moist air rises and flows up along the mountain front. In response to colder temperatures encountered as it rises, the air begins to cool, and the water vapor forms clouds. By late afternoon, the clouds reach their saturation point, and rain falls from the sky. By evening, cooler temperatures dissipate the clouds allowing the skies to be clear and star filled. Average temperatures throughout the park average around 65-70 degrees F throughout the summer months (May-Aug). As a side note, temperatures decline as you gain elevation within the park, as a crude rule, the temperature drops around 3.5 degrees F for every thousand feet you gain in elevation (Wuerthner, 10). It is also not uncommon for the upper elevations to receive light snowfall throughout the summer.

Autumn is a time of transition for both the weather and the animals and plants that live there, with more precipitation than in the winter, but less than the height of the summer. The winter storm patterns have yet to develop. Autumn is characterized by pleasant, bright, sunny day's cool nights, with few thunderstorms. More than 50 percent of the days are clear, and cloud cover occurs only about 20 percent of the time (Gellhorn, 78).

The driest time of the year is the early months of winter. An average of a half inch of precipitation falls during the months of November, December, and January. At lower elevations this still falls as rain, although the upper elevations start seeing considerable snow pack. (Side note: One inch of precipitation in the form of rain equals, on average, ten inches of snow.) By the end of December, upper elevations will commonly have upwards of 3 feet of fresh powder. Most of the significant snowfall doesn't fall until early spring. In an average year, more than an inch of precipitation falls during the months of March, April, May, and June. March and April produce, on average, 75 percent of the precipitation for one year. It is common for the snow depth on top of Trail Ridge road to reach upwards of 20 feet.

The wettest months are the rainy summer monsoon months of July and August. This precipitation, however, tends to come as intense thunderstorms that last for several hours rather than as the intense storms more common in the spring months.

T e m p e r a t u r e A n d A l t i t u d e

When the temperature in Fort Collins/Valentine registers 90 degrees F, it may only 60 degrees at 12,000 feet on Trail Ridge Road. This has to do with the density of air at different elevations. At higher elevations, for any given volume of air, molecules are spaced farther apart, so there are fewer molecules to hold heat and provide oxygen to our lungs (this explains why it is harder to breathe when exerting oneself in the mountains. There is one-third less oxygen in the air at 10,000 feet than there is at sea level.). Due to the lower density of air molecules, they tend to expand to take up more space, allowing for a much greater loss of heat than at lower elevations. (Wuerthner, 10) Again, on average, there is a loss of 3.5 degrees F for every 1,000 feet.

The moisture-holding abilities of the air also diminish with a gain of elevation; this is also due to the lower density of air. Cool air also holds less moisture. Both factors, cold and less dense air, contribute to the increasing dryness that is encountered at higher elevations. Actually, the peaks of many mountains in the Front Range receive less than snowfall than lower elevations. The greatest amounts of snowfall lie between 9,000 and 11,000 feet. (Milner Pass elev.-10,759 feet). At higher elevations, the cool air temperature and low air density tend to produce fewer snow particles.

The reduced ability of the atmosphere to hold moisture also contributes to steep differences in temperature between areas of sun and shade. This same lack of heat-holding also accounts for the large drop-off of temperature when the sun sets in the evenings. It is not uncommon for areas of the park to drop 40 degrees nightly.

**Another effect of the lower density of molecules found at higher elevations is the greater intensity of the blue color of the sky. With fewer molecules to scatter light, the intensity of blue light is increased. So the sky looks bluer (Wuerthner, 11). **

U p s l o p e A n d D o w n s l o p e W i n d s

A slight downslope breeze often develops in the mountains at night, and there is often an upslope breeze during the day. These alternating air flows are the result of the different temperature's of the air. At night, once the sun has set, the clear mountain sky radiates heat back into space and cools rapidly. Since cool air is dense, it begins to slide downhill in response to gravity. This cool air displaces warmer air, which tends to flow up the sides of the valleys. This is important because it has a direct effect on vegetation.

Meadows often persist in subalpine basins an valleys surrounded by trees due to cool air drainage. Many tree species, particularly the seedlings, are very frost sensitive and simply can't invade areas dominated by cold air pockets. These places remain meadows, while trees cloak the surrounding slopes and high points (Kricher, 213). The opposite airflow occurs during the day. As the ground heats up, warm air rises and begins to move upward.

With a better understanding of the current climate conditions of the area, it will be easier to understand some of the reasons why the following animals and plants have adjusted themselves in order to survive. The remaining text will identify several key plants and animals the make the Milner Pass area their home, at least for the majority of the year. Each will be quickly described and followed with information regarding adaptations each has evolved with. The end of the paper will then discuss analogous design ideas that stem from how the local flora and fauna have thrived in the area.

P l a n t s (F L O R A) :



Due to its overall high elevation and harsh climate conditions, the plant communities in Rocky Mountain National Park are not as diverse as those in other areas and other National Parks. In total there are around 900 total species of plants within the park (Wuerthner, 83).

Plant distribution and occurrence are affected by many factors, including **soils, moisture, temperature, aspect, past disturbance, and elevation**. Elevation and disturbance, such as wildfire or avalanche, have the greatest overriding influences upon plant distribution. In general, the higher in elevation, the colder, the shorter the growing season, and the greater the moisture.

Within Rocky Mountain National Park, there are three major vegetation zones: montane, subalpine, and alpine tundra. Many species of plants can be found in all the zones, especially at transition elevations. Milner Pass falls within the upper region of the subalpine ecosystem.

***Species labeled in RED can be found in the subalpine ecosystem and are found in the Milner Pass area.*

MONTANE ZONE (7,600 – 9,000 feet): on the warmest sites, forest of Ponderosa Pine flourishes with well developed underbrush grasses and shrubs. Cooler, north-faces find groves of Douglas Fir and at higher elevations, Lodgepole Pine. Eastern slopes receive, on average, 13 inches of precipitation per year while western slopes receive upwards of 20.

PONDEROSA PINE (images to the right) is the most prevalent species within the Montane zone. Living as it does on arid, warm sites at the lower limits for tree growth, the success of the ponderosa pine is due to several adaptations.

1. The tree develops a large taproot early in its gestation in order to grasp as much moisture as it can from a wide area (Kricher, 306). (3" seedling can have 2' lateral roots.)

2. Old growth develops a thick bark that defends itself even through intense wildfire, sustaining itself when almost all undergrowth burns.



DOUGLAS FIR is another species that is found throughout the Montane Zone, but rarely develops into a successful stand, rather, it finds itself dispersed among stands of Ponderosa Pine and Aspen groves. Douglas fir also develops a thick bark in order to protect it self from fire.

ASPEN TREES (images to right): With high moisture requirements, the Aspen has developed not to rely on seedlings for reproduction. Most Aspen trees regenerate by sending up suckers, or new stems, from their own roots. Damage or destruction to above ground trunks, stimulates the production of root suckers. This is why most large groves of Aspen actually depend upon wildfires, insects, and browsing by larger herbivores in order for reproduction. As long as an Aspen can photosynthesize in the summer it will retain its more important root system. Rocky Mountain National Park scientists have never been able to distinguish any Aspen tree's that have grown as a product of pollination within the park. Instead all the Aspen groves have relied on the suckers each root system creates. Any tree that is product of a 'sucker' is technically a clone of the original tree. Therefore when the Aspens turn in the fall, it is easy to notice separate groves from each other, because each grove will turn at a different rate.



LODGEPOLE PINE (images to right) is also dependent on periodic disturbance to maintain its dominant position in the forests' landscape. Unlike the Ponderosa pine, lodgepole pines grow at higher elevations where snow is much deeper in the winters. Here, fires are less frequent than at lower elevations, but when they do occur, the fires tend to wipe out entire stands of Lodgepole Pines. Although, the lodgepole pine welcomes fires, the pine has serotinous (late developing) cones, which are coated with a resinous bond that prevents the scales from opening and shedding seeds until they are heated. Each tree contains different levels of serotony that affects the actual temperature at which the seeds will be released. (Some cones will actually release in absence of a fire on a hot summer's day.) Nevertheless, remaining closed until a fire is an ecological adaptation that contributes to the dominance of lodgepole pine upon a site, ensuring good seedling upon a site after a blaze.



SUBAPLINE ZONE (9,000 – 11,000 feet): this zone sees the most vegetation out of all the zones within the park. Due to heavy forest cover, snow melts slowly, ensuring adequate soil moisture for plant growth well into the summer. This largely forested area is dominated by **ENGELMANN SPRUCE** (below, left) and **SUBALPINE FIR** (below, right). Both the Spruce and the Subalpine Fir possess narrow crowns, with branches that spray downward, enabling them to shed snow as it packs onto the tree.



Aspen, Lodgepole Pine, and Ponderosa's are still prevalent in recent burn areas throughout the subalpine zone, often forming pure stands.

At the highest elevations of the subalpine zone, the Engelmann Spruce, subalpine fir, and limber pine all assume a stunted growth pattern. This is known as the 'Twisted Krummholz Growth Pattern,' which is German for "crooked trunk". (Gellhorn, 11) Both spruces and fir will form wind shear "fences," where the tree in front provides protection for the tree behind, and snow often covers the branches, allowing a gradual increase in the height of each succeeding tree. If snow pushes a lower branch to the ground and pins it there, the branch will sometimes take root, establishing a new root system (i.e. vegetative reproducing). It is also common to see pines at higher elevations with growth only on side of the trunk; this is due to the intense wind shear from a single direction over the course of over a hundred years. Some trees near timberline can be over a hundred years old and only be 3-6 feet tall.

Vegetative reproduction dominates at higher elevations, where harsh climactic conditions are unfavorable for seedling establishment. Even with these harsh conditions, old-growth stands of spruce sometimes reach 300-500 years of age and grow to a girth of 3 feet or more (Kricher, 336). Spruce and fir are able to persist because they are able to photosynthesize at lower temperatures than other conifers. This substantially lengthens the season of growth for these trees.

ALPINE TUNDRA ZONE (above 11,000 feet): Tundra is Russian for "land of no trees." Approximately half of the alpine species found in Rocky Mountain National Park are identical to those found in the Arctic (Wuerthner, 96). Many factors are against growth at this elevation: a short growing season, severe wind, high-intensity solar radiation, and drought as a result of drying winds.

Alpine plants display a number of adaptations to their harsh environment. The plants of this zone tend to be long-lived perennials. There are few annuals, since the short growing season deters a sufficient seeding. There are also a significant amount of sedges, grasses, lichens, and mosses, all of which are quite hardy and enter a state of dormancy if conditions are not sufficient for growth.

Many dwarfed species can be found within the tundra. The leaves and stalks tend to be smaller and the number of flowers on each plant fewer than on similar low-elevation species. Their small size keeps plants closer to the ground, where microsite temperatures are often warmer, and also provides protection from alpine winds. Despite the smallness of the stems and stalks, the bloom is relatively large for the proportion of each flower. This is because large blossoms gather more solar radiation, helping heat up the plant physiological process, allowing for it to attract insects that they rely on for cross-pollination (Zwinger, 97).

Another adaptation to cold is the presence of anthocyanin, a red pigment that gives alpine plants a darker coloration. This helps the plants absorb heat. Because of their adaptations to cold, alpine plants can begin to photosynthesize when temperatures are just above freezing.



Mammals: *warm blooded, with a body covering of hair or fur*

Being able to maintain an internal temperature is necessary for mammals to utilize environments where cold temperatures are the norm as in Rocky Mountain National Park. Hair or fur provides insulation; critical for maintaining internal temperatures, and often protective coloration.

Mammals of the Sub-Alpine:

The sub alpine zone receives the most snowfall of all ecosystems, making it one of the most intolerable of ecosystems within the park. The weather itself limits which species are able to remain throughout an entire year. Deer and elk, for instance, utilize this zone in the summer but move to lower elevations to endure the winter, whereas moose are able to endure the harsh winters. Black bears roam the zone in the summers, while lying dormant throughout the winter.

Classification and Adaptation:

ELK:

The Elk is primarily nocturnal, but is especially active at dusk and dawn. Unlike the much smaller White-tailed Deer, which is often heard crashing through the brush, the Elk moves through the forest rapidly and almost silently. Elk, for the most part, choose to leave the harsh winters and migrate to a warmer micro-climate at lower elevations. With high numbers of elk within the park, many packs of elk have been forced to spend their winters at higher elevations, searching for land to graze. The increase in the numbers of elk has begun to interrupt the delicate cycle of the alpine ecosystem. Ptarmigan have suffered in decreasing population as a result of less foliage to eat during the winter months (Fisher, 51).

Elk have a specialized stomach that allows them to digest and eat the food that is able to find within the extreme environments the altitude brings with it. An elk stomach actually consists of four different chambers that allows for the storage of food.

Rough pieces of bark, trees, and plants are stored and chewed at later times then pass through a series of stomach chambers that continually breaks down the matter separating all water for nourishment, then finally entering a stomach that is similar to humans. Their highly developed digestive system allow for elk to eat almost any plant material they can find during any time of the year.

Twice a year elk shed their entire pelt. During the summer months, the elk has only one layer of fur keeping it cool during the days and warm during the nights. By early September they lose the summer coat and begin to grow a new, heavier coat, five times thicker than the summer coat. The winter coat consists of two layers one thick with long guard hairs and the other, a dense woolly undercoat. The winter coat also is usually many shades darker than that of the summer coat. The change in color allows for the elk to absorb more of the sun's rays in the winter keeping them warmer in the winter.



Additional Notes:

Elk living in open, hot California valleys are much lighter in color than those in the Rockies. The lighter coat allows them to deflect more of the sun's rays; since they are already in a warm environment they have no need to gain additional heat (Fisher, 50).

MOOSE:

The most important adaptation of the Moose would be its overwhelming size. Moose can reach upwards of seven and a half feet, making them the tallest of the hoofed mammal within the park. The moose's long legs enable them to move swiftly through drifted snow and wet lands. It also allows them to carry a sufficient amount of fat storage for the winter. Their pelt has also adapted to allow for added warmth. Their thick, hollow hair is wider at the tip than at the base. The shape helps trap an efficient insulating layer of air next to their bodies.



Moose are also very accomplished swimmers. They have been known to dive up to 15 feet in order to forage on plant life on the bottom of mountain lakes. They have also been known to swim up to 30 miles. They have developed a specialized nose that is able to close when in the water. It protects them from any water reaching their air passage.

BLACK BEAR:

The Black Bear is one of the only animals within the park that actually hibernates through the winter. These bears don't actually 'hibernate' but incur a period of dormancy that last through the cold months. A true 'hibernator' lowers their body temperature to that of its surroundings; but the black bear actually retains a constant body temperature as it would in the summer. They sleep for months without eating, drinking, urinating, or defecating. Hibernators with lower body temperature, such as chipmunks, woodchucks, and ground squirrels, cannot do this. These other mammals must awaken every few days, raise their temperatures to over 94 degrees Fahrenheit, move around in their burrows, and urinate. Black bears develop far more insulated pelts and have lower surface-to-mass ratios than these smaller hibernators. The 'dormancy' that the black bears induce is an evolutionary response to seasonal shortage of food as well as to cold weather (Armstrong, 143).

Black bear adaptations to obtain and digest food are all specialized toward exploitation of summer foods. Their body form, claws, teeth, dentition, stomach structure, and digestive tract are all geared to obtain small, easily digestible foods like berries, nuts, leaves, colonial insects, and newborn animals—foods available mostly during the warm growing season. They lack the ability to digest winter's tough vegetation or to chase down adult prey animals in the snow.



Additional Notes:

Black bears have a 99 percent rate of survival throughout the winter.

Native Americans believed bears to be smarter than people because bears knew how to survive winter food scarcity.

Bears living off their accumulated body fat have hibernating cholesterol levels more than twice summer levels and more than twice as high as the normal cholesterol levels of most humans. Yet bears exhibit no hardening of the arteries or formation of cholesterol gallstones. (Armstrong, 144)

Hibernation for the black bear, as for other mammals, is primarily a mechanism to conserve energy through seasons of no food or water. The process does not work in summer.

BIGHORN SHEEP:

Bighorn are one of the most robust mammals of the area. They have developed a muscular body that compares to no other of hoofed animal. Their extreme fitness allows for swift movement along the steep mountain faces where they tend to congregate. Bighorns, perhaps, have adapted to this rather inhospitable habitat because there is a lack of competition as well as protection from predators. A good swimmer and an excellent rock climber and jumper, the bighorn has hooves that are hard at the outer edge and spongy in the center, providing good traction even on sheer rock.



During the fall, their coats are a dark brown. Their coats gradually fade to a light gray for the winter, allowing for the Bighorn to blend into their surroundings throughout the year. This change of fur allows for further protection from any predators that might arise.

Bighorn do sometimes spend their winters within the subalpine and even above tree-line. Although the fur that insulates mammals covers most of the body, it cannot cover all parts. Noses, feet, legs need to be left bare in most cases to be functional, allowing animals to become susceptible to the cold. It is also a problem when an animal's body temperature is warmer than that of the snow because when one stands still, the snow below them would begin to melt. For this problem, both elk and Bighorn's feet are able to remain only a couple degrees above zero in order to prevent the snow from melting while still being as flexible and functional as they are in the summer months.

SNOWSHOE HARE:

As its name implies, the Snowshoe Hare has very large hind feet that enable it to cross areas of soft snow where other animals sink into the powder. This gives a tremendous advantage of its predators.

In response to shortening day lengths at the onset of winter, Snowshoe Hares start changing into their winter camouflage whether the snow falls or not. The hares have no control over the timing of this change, leaving many that turn early, susceptible to predators. Many that do turn early hunt for small patches of snow to stay around until the entire area is covered with snow.



YELLOW BELLIED MARMOT:

The yellow-bellied marmot relies purely on hibernation in order to withstand that harsh winter temperatures and precipitation the upper elevations see throughout the winter. The marmot is a 'true hibernator'. They lower their body temperature to a few degrees above the surrounding den temperature. They spend the summer months basically storing up fat in order to survive the winters in their dens.



Additional Notes:

Marmots tend to form actual social societies among themselves in order to distribute tasks among a colony, increasing their chances of survival.'

There are still many other smaller rodents and bats that inhabit the sub-alpine, but they all tend to follow the same rules as the above mammals have when it comes to maintaining themselves throughout the winter. Over time each animal has adapted itself in order to survive in the mountainous region. Major reactions to the winter can be listed as follows:

Migrate - deer and elk both tend to retreat to lower altitudes in order to escape such harsh conditions.

Hibernate – black bears and rodents hibernate through the winter in order to escape, relying on a successful scavenging summer season to get them through the winter.

Remain and/or Change – some animals (snowshoe hare, elk, and bighorn) have adapted their coats to better fit the region in the winter, whether it is for better for gaining the sun's rays or to hide from predators, it allows them to increase their chances for survival. While some other animals' physical abilities allow them to perform better in the snow.

LESSONS OBTAINED FROM THE ENVIRONMENT AND HOW THEY CAN BECOME ANALOGOUS CONDITIONS FOR DESIGN

SITE DETERMINACY:

BUILDING WITHIN CLUSTERS: It is rare that you see a standalone tree in upper elevations. Trees tend to support each other in the extreme environment, once clustered together they can form a sort of 'microclimate' that increases the chance of their livelihood but also other plants and animals living beneath them.

DESIGN CONDITIONS:

1. Since most trees have adapted themselves to sustain life by clustering one might consider keeping a group of buildings either covered, or in some way protected, by a dominant building. In the case of the interpretive center and living units, the main center would either contain or hold support for the living units. The main building would basically re-create a sort of man-made micro-climate for the adjacent program. (plate a.1)
2. Create a hierarchical recession with the buildings masses, allowing for protection of the small masses within the larger ones, as trees do at upper elevations to sustain life. (plate a.2)

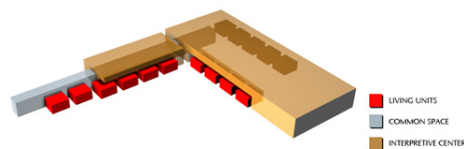


plate a.1 - covered microclimate

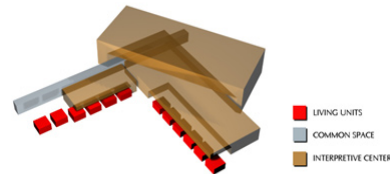


plate a.2 - hierarchical recession

BUILDING AS A COLONY: In somewhat the same manner as building with clusters, this idea stems from the colony type behavior that many rodents and squirrels use in order to protect themselves from predators as well as the climate. These animals divide themselves into a sort of hierarchical managing system. They divide tasks amongst themselves in order to protect the group rather than just protecting a single animal. This increases their chances of survival as a species (not as single animals).

DESIGN CONDITIONS:

1. As with the clusters above, the buildings could have a single main unit that supports the others, possibly a centralized location amongst the others. This would allow for an easy transfer of services between all separated units (plate b.1)
2. If the buildings are scattered, there would still be a common space or linkage back to each other or back to a single centre. (plate b.2)

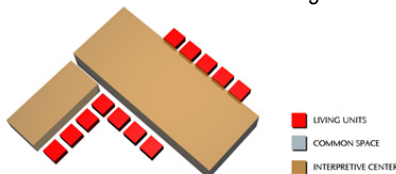


plate b.1 – centralized main space

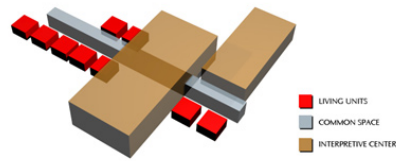


plate b.2 – tight configuration

CONSTRUCTION WITHIN NATURE: Within the area of Milner Pass, trees have created a clear line at both the western and eastern edge of the pass. The line has naturally occurred for a reason; mainly do to the cool temperatures that the area receives at night when the cold air sinks to the lowest portions of the pass. Seedlings cannot sprout in conditions of frost, so most trees don't make it (creating the clear edge of trees).

DESIGN CONDITIONS:

1. The structure itself could reside purely within the forest, using the micro climate that the trees create to help support the building. (plate c.1)
2. The structure could also place itself away from that line, and develop itself as a separate piece from nature. This would mean that the building would have to protect itself, creating its own microclimate. (plate c.2)
3. The building could take advantage of a portion of the existing forest and branch itself out into the open spaces of the pass. (plate c.3)

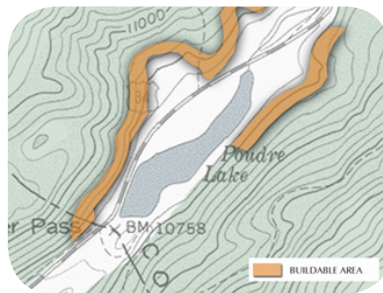


plate c.1 – within forest

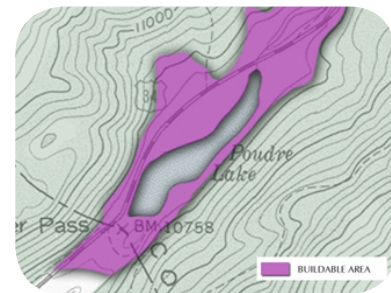


plate c.2 – open areas

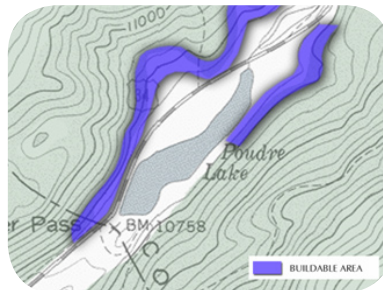


plate c.3 – forest & open space

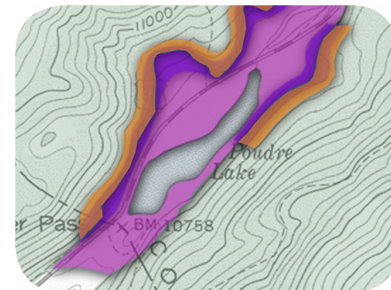


plate c.4 – total area

DESIGN DETERMINACY:

THICK OUTER LAYER: Both Moose and Elk help protect themselves by growing a thicker pelt in the winter. During summer months, they both only have one layer of hair, and the color is lighter than it is in the winter. In the fall, they begin to simultaneously shed the summer coat and grow their winter coat. The winter coat is also darker in color as to absorb more of the sun's rays to keep them warm.

DESIGN CONDITIONS:

1. The design will have to include techniques for better insulation for the late fall months. Since the building will only be open for 6 months of the year, the building walls will have to deal more with sustaining the structure rather than keeping it warm during the winter.

MIGRATION/HIBERNATION: Each animal/plant of the subalpine ecosystem deals with the onset of winter a bit differently. Some have developed mechanisms that allow them to thrive in winter conditions, while others tend to migrate to lower elevations where conditions are more favorable. Some animals, such as the Black Bear and many rodents, enter a period of dormancy or hibernation since they are not suited to live in the harsh winter conditions.

DESIGN CONDITIONS:

- 1. The building(s) possibly could break down into a smaller more tolerable mass that would be able to endure the winter with less damage. The building could be collapsible, or even a kit of pieces that is taken down the pass before winter.*
- 2. The design could also break down and could be stored in designated areas of the site. Then re-assembled in the spring when conditions are better.*
- 3. Or, the structure itself is designed with enough integrity that it will be able to withstand the extreme conditions (snow, wind, etc.). It could still somehow 'winterize' itself in order to further protect itself when there are no occupants, but would still stay intact.*

HIDING FROM NATURE: Some animals have the ability to hide themselves from predators and also the weather. Whether it is a Snowshoe Hare changing its color to white in the winter or a bear retreated to its den in order to protect itself from the outside elements, animals have found a ways to actually hide from nature.

DESIGN CONDITIONS:

- 1. The idea of camouflaging is not really an option for the building. The building is a place where the general public needs to be able to see. Although it can respond in somewhat the same manner as the local fauna. The building could strengthen itself by being partially inset into the ground, allowing for the earth to become some of the major support for the building. Plus, with most of the building located in the sloped site, it would allow for easier covering of itself in the winter.*
- 2. Although camouflaging is not an option, the outside material and its color can strongly affect the way the space inside will feel. The sun's rays at this elevation increase in its intensity, so solar heat can build up fast on a wall that might be of a dark color.*

DEALING WITH FIRE: Many trees have developed ways of ensuring that their species will always thrive. Even in cases of devastating fires. Many coniferous trees aren't able to seed unless there is an intense amount of heat present; this ensures that the seeds are held until a time when they are actually needed. And usually after a fire, the soil becomes extremely fertile due to all the waste that was burned and dies, which increases the chances of the seedlings to sprout and grow. Much of the old-growth can actually sustain an intense fire as well. The older the tree, the thicker the bark becomes. Aspen trees also depend on suckers to create new trees when the above ground tree dies or is burned. As long as the roots are intact, a stand of Aspen usually will always thrive.

DESIGN CONDITIONS:

1. There is no way to fully ensure protection of building in fire. But since fires within the area of Milner Pass tend to usually be spot fires caused by lightning, the intensity is not as high as many that occur at lower elevations, which increases the chances of a building to sustain a fire. In order to do so, the optimal site for the buildings is away from the treeline or perhaps integrated into the ground.

PROGRAM

THE FOLLOWING PAGES INCLUDE PORTIONS OF THE **PROGRAM BOOK** CREATED AT THE BEGINNING OF THE FALL SEMESTER. THE PROGRAM CONTAINS THE FOLLOWING DIVISIONS:

-PROGRAM INTRODUCTION

-EXISTING CONDITIONS

-SITE ANALYSIS

-PROJECT SCOPE

PROGRAM // PROJECT INTRODUCTION

THE INTRODUCTION PORTION OF THE **PROGRAM** CONTAINS THE FOLLOWING:

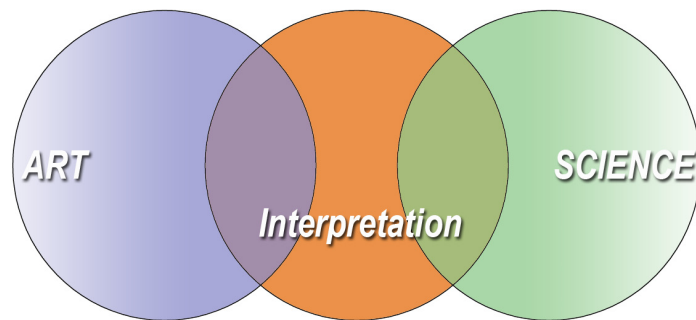
-*BRIEF PROJECT INTENTION*

-*SEMESTER SCHEDULES*

-*RESEARCH SCOPE*

The design project entails the integration of the arts and sciences to create an educational center for the public to learn about the Continental Divide and the surrounding ecosystem. The intention is to design a building that exhibits an expression of its adaptability to climactic conditions and plays an interactive role in how one perceives the surrounding environment. The mixing of both art and science will allow for the building to become a viewing device that will adapt to the site's multiple elements in a manner that can induce a clear learning environment.

The design of the building will centralize itself around a clear merging of art and science. These two disciplines (in the order of an artist's residence and scientific laboratories) will merge to develop a distinct learning environment in which the general public can learn from as well as observe. It is important that both disciplines come together in order to interpret the uniqueness and complexity of the surrounding environment to the public. Both disciplines will converge on a common space (Interpretive Center) that will act as a showcase for the work that is developed.



<div> <div>FALL SCHEDULE</div> <div>KURT CISAR</div> <div>meetings @ 8-10am</div> </div>						
	M	T	W	R	F	notes
WK 1	aug 23	aug 24	aug 25	aug 26	aug 27	
WK 2	aug 30	aug 31	sep 1	sep 2	sep 3	
WK 3	sep 6	sep 7	sep 8	sep 9	sep 10	Program book due the 13th of September.
WK 4	sep 13	sep 14	sep 15	sep 16	sep 17	Begin digitizing site contours, and develop computer model of site.
WK 5	sep 20	sep 21	sep 22	sep 23	sep 24	Begin Physical Model of site surroundings. Finish digital model of site.
WK 6	sep 27	sep 28	sep 29	sep 30	oct 1	
WK 7	oct 4	oct 5	oct 6	oct 7	oct 8	
WK 8	oct 11	oct 12	oct 13	oct 14	oct 15	Begin revisions of any material discussed in the presentation.
WK 9	oct 18	oct 19	oct 20	oct 21	oct 22	Massing models (both physical and viz)
WK 10	oct 25	oct 26	oct 27	oct 28	oct 29	
WK 11	nov 1	nov 2	nov 3	nov 4	nov 5	
WK 12	nov 8	nov 9	nov 10	nov 11	nov 12	Begin physical model for presentation as well as orthographic drawings to represent current stage.
WK 13	nov 15	nov 16	nov 17	nov 18	nov 19	
WK 14	nov 22	nov 23	nov 24	nov 25	nov 26	Diagram program and intentions for blind review.
WK 15	nov 29	nov 30	dec 1	dec 2	dec 3	
WK 16	dec 6	dec 7	dec 8	dec 9	dec 10	
WK 17	dec 13	dec 14	dec 15	dec 16	dec 17	

<div> <div>SPRING SCHEDULE</div> <div>meetings @ 8-10am</div> </div>						
	M	T	W	R	F	notes
WK 1	jan10	jan11	jan12	jan13	jan14	Schedule
WK 2	jan17	jan18	jan19	jan20	jan21	Structure/Plans Interpretive Space/Exhibit
WK 3	jan24	jan25	jan26	jan27	jan28	Interpretive Space/Surfaces Labs/Studios
WK 4	jan31	feb1	feb2	feb3	feb4	Program Identity/Finish Plans MID CRIT REVIEW*
WK 5	feb7	feb8	feb9	feb10	feb11	Review Changes Changes/Details
WK 6	feb14	feb15	feb16	feb17	feb18	Interpretive Space Detailing
WK 7	feb21	feb22	feb23	feb24	feb25	Labs/Studio Detailing
WK 8	feb28	mar1	mar2	mar3	mar4	Detailing
WK 9	mar7	mar8	mar9	mar10	mar11	Detailing/Model
S P R I N G B R E A K						
WK 10	mar14	mar15	mar16	mar17	mar18	Production FINAL REVIEW**
WK 11	mar21	mar22	mar23	mar24	mar25	Production consists of developing a final presentation w/ a physical model. Possibly present in a manner that mimics the type of exhibit the facility would have.
WK 12	mar28	mar29	mar30	mar31	apr1	D O C U M E N T A T I O N
WK 13	apr4	apr5	apr6	apr7	apr8	
WK 14	apr11	apr12	apr13	apr14	apr15	
WK 15	apr18	apr19	apr20	apr21	apr22	
WK 16	apr25	apr26	apr27	apr28	apr29	
WK 17	may2	may3	may4	may5	may6	
<div> <div>* MID CRIT REVIEW –</div> <div> 1- Finished floor plans, interior and site (surface materials specified) 2- Main structural elements defined by material and basic construction (typical building and retaining walls) 3- Interpretive Space defined by use/function (develop exhibit spaces). 4- Develop the Labs/Studios as a 'Viewing device' </div> </div> <div> <div>** FINAL REVIEW –</div> <div> 1- Extend the interpretive experience into the detailing of the facility. 2- Typical wall sections of common instances (major connections & material joints) 3- Interior Detailing of spaces (material choices and applications) 4- Exterior Facade details of EACH building (material choices and construction) </div> </div> <div> 1:20 model (Entire Site) 48" x 30" 1/4" section model (typical detail, i.e. wall section) </div>						

WHAT WILL INFORM THE DESIGN, AND HOW?

The information gained from the following list will aid in the understanding of the site as well as the building type. The list is an outline of procedure that will be used in the design stages of development. Analysis will include the following:

// PRECEDENTS

In order to gain knowledge about a facility as the one proposed, it is necessary to analyze the project as if it were three separate building types. Each of these building types revolves around key issues of the project: art, science, and interpretation. The projects below have been chosen for dissimilar reasons and are further explained within the text.



*YAQUINA HEAD INTERPRETIVE CENTER - - THE MILLER/HULL PARTNERSHIP
(PG. 42-43)*

Projected Analysis:

- square footage take-off
- concrete construction withstanding ocean winds
- programmatic adjacencies // example of dense program
- interaction between administrative and public spaces



*ELISE CHAPIN SANCTUARY INTERPRETIVE CENTER - - THOMAS HANRAHAN & VICTORIA MEYERS ASSOC.
(PG. 44-45)*

Projected Analysis:

- relationship to the ground // using itself as a datum
- design as a viewing device
- programmatic adjacencies



*ANTELOPE ISLAND STATE PARK VISITOR CENTER - - EDWARDS & DANIELS ARCHITECTS
(PG. 46-47)*

Projected Analysis:

- programmatic adjacencies // example of scattered program
- square footage take-off



*ALPINE VISITOR CENTER, ROCKY MOUNTAIN NATIONAL PARK
(PG. 48-49)*

Projected Analysis:

- climactic adaptations
- high-altitude design // utilities and services



*HIGHLANDS CENTER AT CAPE COD NATIONAL SEASHORE
(PG. 50-51)*

Projected Analysis:

- design intent // similar program at larger scale
- adjacencies // interaction between disciplines (art / science)



*THE NEUROSCIENCES INSTITUTE - - TOD WILLIAMS BILLE TSEIN & ASSOCIATES
(PG. 52-53)*

Projected Analysis:

- design intent // similar program
- adjacencies // interaction between disciplines (theory / science)



*VISITOR CENTRE, KARJINI, AUSTRALIA - - WOODHEAD INTERNATIONAL
(PG. 54-55)*

Projected Analysis:

- design intent // similar program and massing
- desolate location // interaction with surrounding environment
- material usage // sustainability

// SITE // CLIMATE_ECOSYSTEM

There are many factors that will play into the resulting design of the project that are effected by the existing site. Many of these factors have to be fully understood, and others purely need to be identified, but all of them will effect the design and functionality of the structure.

SITE OCCUPANCY: The site is actually only accessible for 5-7 months of the year. Due to the extreme winter snowfall, it is not possible to reach the area for several months. The area also in the spring and summer months endures a very temperamental weather pattern. Understanding how and when will become critical.

ADAPTATION: Since the site sits at an elevation where many of the plants and animals have learned to adapt in order to survive, designing a structure that can sustain itself year-round will rely on understanding these reasons.

THE DIVIDE: Understanding the importance of the Continental Divide and how it effects the different ecosystems will become important since the Interpretive Center will function as a learning tool explaining its significance.

ACCESSIBILITY: The site also sits at a midpoint between two small cities. With only one way to access the site, understanding the role of the cities will become important in order to distinguish available services and utilities for the site.

// SITE // BUILD_LOCATION

The area of Milner Pass has many attributes that lend itself to becoming a future site of this design project, even though the site sits in an area that is extremely volatile, both in terms of climate and terrain. It will become essential to understand these factors and others so as to choose the correct placing and orientation for the proposed design.

SITE GRADE: It will be crucial to understand both where the building sits in terms of its immediate relation to the ground as well as what is above/below the site. Understanding what is around the building will be just as important as to what its immediately rest on.

RELATIONSHIP TO FOREST: The forested areas at this elevation are there for a reason, they have been able to adapt to the climate and terrain. It will be important to decide exactly how the design will interact with the forest. Whether it will fully integrates/seperates itself, or places itself on the edge of both.

RELATIONSHIP TO GROUND: Both the plants and animals of the ecosystem depend on the the ground as its support for life. For trees, what is below ground is almost more important that what is above, and many animals that spend the winters in the area actually retreat to underground dens for protection. Understanding these reasons will aid in developing a proper 'built' relationship with the ground.

TIME: How will it sustain itself over time? Will it 'scar' the landscape, or leave it protected?

PROGRAM // EXISTING CONDITIONS

THE FOLLOWING PAGES CONTAIN INFORMATION SPECIFIC TO THE SITE AS WELL AS THE AREAS IMMEDIATE SURROUNDINGS. THE SECTIONS BELOW COMPRISE MOSTLY FROM SITE ANALYSIS DONE WITHIN THE FALL SEMESTER.

-TRANSPORTATION & ACCESSIBILITY

-SURROUNDING COMMUNITIES

-PARK DEMOGRAPHICS

-CONTINENTAL DIVIDE

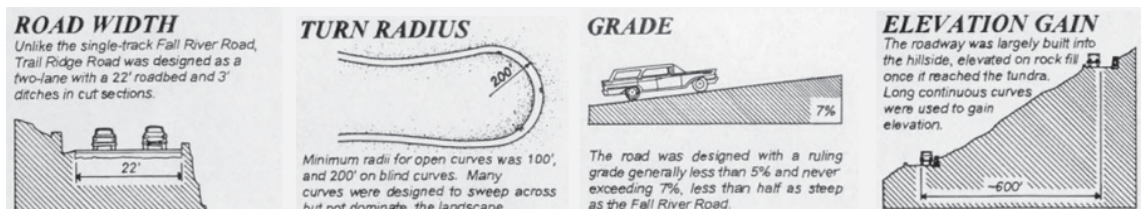
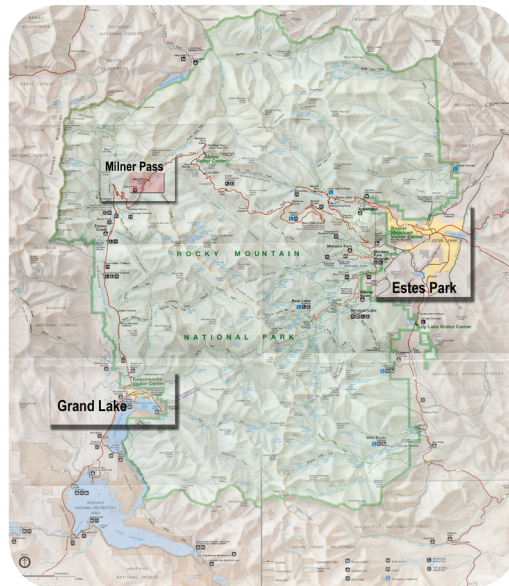
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// TRAIL RIDGE ROAD_SURROUNDING CITIES

The entire park only has four public entrances/exits. Only three of these enable a visitor to actually access the site. Two entrances are on the east side of the Continental Divide, leaving only one into the park on the western edge. Estes Park sits on the eastern edge of the park. Most visitors access the park from this side. Highway 34 takes the visitors through the park from Estes Park, and takes them up Trail Ridge Road (HWY 34), then heads back down the western slope down to Grand Lake. The complete drive takes over an hour even though it is approximately 40 miles. It takes nearly 40 minutes to get to Milner Pass from Estes Park, and about 25 from Grand Lake.

Trail Ridge Road is the highest continuous highway in the United States, with more than eight miles lying above 18,000 feet and a maximum elevation of 12,183 feet. The highway was designed with a grade generally less than 5%, and never exceeding 7%. It also was designed as a two-lane highway with a 22' roadbed. The highway generally closes in mid-October then re-opens typically after 40 days of plowing around Memorial Day. The area of Milner Pass is accessible by vehicle usually 6-7 months of the year. Areas at the top of the pass can see upwards of 25 feet of snow in the winter, making it inaccessible for nearly any usage during the winter.



In the summer of 2000, the Historic American Engineering Record (HAER) came to Rocky Mountain National park to document the history of the park's road system. These drawings illustrate some of the major aspects of the design of Trail Ridge Road.

// ESTES PARK & GRAND LAKE:

Rocky Mountain National Park is about 70 miles northwest of Denver, Colorado. The park is fed on both sides by towns of much smaller size. Estes Park sits at the eastern two entrances of the park, while Grand Lake lies at the one western entrance. Both cities are primarily tourist destinations.

ESTES PARK//

Estes Park sits at an elevation of 7,500 feet. With an off-season population around 5,500 people, Estes Park relies heavily on tourists coming to stay while visiting the Park. Estes sees almost 300 days of sunshine a year, with much less precipitation than Grand Lake. Most summer storms lose their intensity over the range, resulting in a lesser amount of rain in the summer as well as snow in the winter. Estes rarely sees more than 20 inches of total precipitation in a year.

As stated before, Estes Park is considered a tourist town. Little to no industry can be found within the city, mostly lodging and tourist shops. Tourism has been the main economic inflow since the turn of the 20th century. Rocky Mountain National Park, in its early days, was used as a source of revenue for the city as well as the government. People were only able to visit the park via paid-guided tours. This continued until the late 1930's when it was proven to be a monopoly of sorts. Ever since then, the city has thrived on visitors entering the Park, and has been their main source of revenue.



Lake Estes and the village, with Rocky Mountain National Park in the background

Image courtesy www.estesnet.com

// ESTES PARK & GRAND LAKE (SEE MAP ON PREVIOUS PAGE):

GRAND LAKE//

Grand Lake sits at an elevation of 8,369 feet. With an off-season population around 450 people, Grand Lake also relies heavily on tourism. The town got its start as a small Mining/ Logging town and Grand Lake itself is the largest body of water in Colorado. Much of the water is a product of snow melt off the divide. Since most of the snow falls on the western slope of the Continental Divide, most of the precipitation collects in this area.

Grand Lake as mentioned before, receives more rain since its on the west side of the range. The town can see upwards of 30 inches of precipitation throughout the year. Most falling in the spring months as heavy rain. Storms that develop from rising heat to the west dump most of their precipitation before exhausting it by moving over the front range. As a result of the heavier amounts of precipitation, the Grand Lake Valley has more dense forests and vegetation than that of the eastern side of the Divide (i.e. Estes Park).



Grand Lake Downtown Village (left), view looking west from downtown district (right).
Image courtesy www.cyberwest.com

R o c k y M o u n t a i n N a t i o n a l P a r k

// HISTORY OF THE PARK

In 1903, F. O. Stanley, inventor of the Stanley Steamer automobile, came to Estes Park for his health. Impressed by the beauty of the valley and grateful for the improvement in his health, he decided to invest his money and his future there. In 1909, he opened the elegant Stanley Hotel, a classic hostelry exemplifying the golden age of touring.

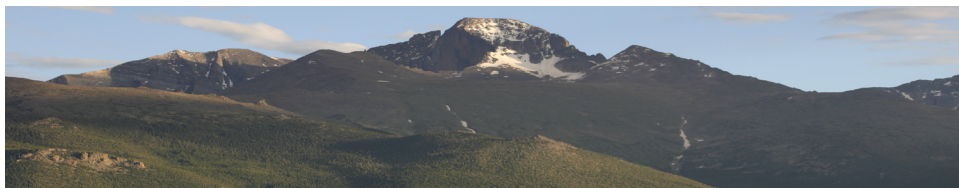
Largely due to Stanley's efforts, the Estes Park Protective and Improvement Association was established to protect local wildflowers and wildlife and to improve roads and trails. "Those who pull flowers up by the roots will be condemned by all worthy people, and also by the Estes Park Protective and Improvement Association," they warned. It was the start of a conservation ethic that has become increasingly important and complex.

Even more important to the future of the area was Enos Mills, who came to the Longs Peak area in 1884 when he was 14 years old. A dedicated naturalist, he wrote eloquent books about the area's natural history. Not long after his arrival, Mills bought the Longs Peak Inn and began conducting local nature trips.

In 1909, Mills first proposed that the area become the nation's tenth national park to preserve the wildlands from inappropriate use. It was his vision that you would arrive here years later to experience the wonderful Rocky Mountain wilderness he knew. "In years to come when I am asleep beneath the pines, thousands of families will find rest and hope in this park," he proclaimed.

Unleashing his diverse talents and inexhaustible energy, he spent several years lecturing across the nation, writing thousands of letters and articles, and lobbying Congress to create a new park that would stretch from the Wyoming border south to Pikes Peak, covering more than 1,000 square miles. Most civic leaders supported the idea, as did the Denver Chamber of Commerce and the Colorado Mountain Club. In general, mining, logging, and agricultural interests opposed it. The compromise drafted by James G. Rogers, the first president of the Colorado Mountain Club, was the establishment of a smaller park (358.3 square miles). On January 26, 1915, under President Woodrow Wilson, it was declared Rocky Mountain National Park.

The park has since grown to more than 415 square miles. In 1990, it gained an additional 465 acres when Congress approved expansion of the park to include the area known as Lily Lake. The National Park Service, the Conservation Fund, and some diligent legislators successfully halted land development in this area adjacent to the park's boundary. It now is an important buffer zone that helps protect the migratory routes of wildlife in the park.



// CURRENT ARTISTS RESIDENCY PROGRAM

Artists have had a long-standing impact on the formation, expansion and direction of the country's national parks. Painting the dynamic landscapes of the American West, visual artists like George Caitlin and Albert Bierstadt publicized many of the natural wonders of a land little known to the eastern populace. These artists' visual records focused attention on an emerging western landscape, and their work helped to stimulate the establishment of many of our national parks.

Writers, sculptors, musicians, composers, and other performing artists also draw upon the multifaceted quality of parks for inspiration. All of these artists translate the national park's purpose, as a place of pleasure and preservation, into images which bring others enjoyment and a deeper understanding of the parks.



Artist-
In-Residence
Program

Rocky Mountain National Park's Artist-In Residence program provides professional artists the opportunity to become a part of a long established tradition of artists in national parks. The current program allows for artists of all types to stay at the park for two week periods from June to September. In return, the artists are asked to donate to the park an original piece of work representative of their artistic medium based on their two-week stay in the Park. The creative works are exhibited as frequently as possible through the individual visitor centers as well as nationally. The artists are also required to present two public programs during their residency. This interaction can be tailored to an individual's medium, interest, and experience.

Artists presently stay in a historical cabin that is within the park. The cabin has one bedroom and bath, small kitchen and a fireplace, with limited central heat. The size of the cabin only allows space for one artist to stay, but since the Artist-In-Residence program was initiated in 1984, there has been a significant increase in interest for the program by prospective artists and visitors. Expanding the Artist-In-Residence program will allow for an intermixing of ideas between not only other artists but also allow for the artists to interact with researchers within the park, creating a place where art and science can come together to better explain and educate the public.

C o n t i n e n t a l D i v i d e

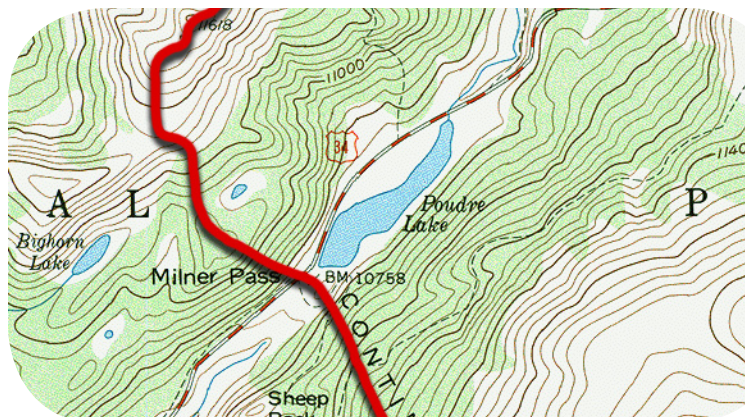
The Continental Divide is the most notable watershed of the North American continent. The mountains comprising it extend generally north-south, thus dividing the continent's principal drainage into waters flowing eastward (e.g., into Hudson Bay in Canada or the Mississippi River in the U.S.) and waters flowing westward (into the Pacific Ocean). Most of the divide runs along the crest of the Rocky Mountains, through British Columbia in Canada and through the states of Montana, Wyoming, Colorado, and New Mexico in the U.S. Its central point is Colorado, where it has many peaks above 13,000 ft (3,962 m). It continues southward into Mexico, roughly paralleling the Sierra Madre, and into Central America. The Divide actually crosses Highway 34 at the southern end of Poudre Lake.



CONTINENTAL DIVIDE // LOWER UNITED STATES



CONTINENTAL DIVIDE // CENTRAL ROCKY MOUNTAIN NATIONAL PARK



CONTINENTAL DIVIDE // MILNER PASS

PROGRAM // SITE ANALYSIS

*THE FOLLOWING PAGES CONTAIN INFORMATION SPECIALIZED TO THE MILNER PASS
PORTION OF ROCKY MOUNTAIN NATIONAL PARK.*

-SITE CONDITIONS

-SITE PHOTOS // DOCUMENTATION

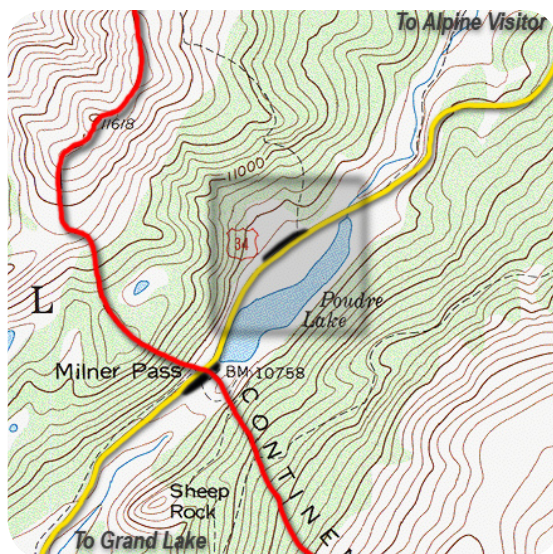
-SURROUNDING ECOSYSTEM

// MILNER PASS // CONTINENTAL DIVIDE

The site chosen is located off the two lane highway in an area named Milner pass, at an elevation of 10,759 feet (see maps below). The building will reside on the edge of Poudre Lake, the headwater for the Poudre River. The lake lies directly beside the Continental Divide and is created and supplied by annual snowmelt from the surrounding mountains. Since the site is below tundra and on the western edge of the mountain range, the site does not receive as much snow and torrent weather as does the higher elevations and eastern portions of the mountain range; although the highway does close during most winter months due to heavy snowfall. In reaction to the heavy amounts of snow, the design will have to close for most of the winter months due to the highway closing.

Since the site is located less than one-thousand feet below tundra, weather extremes will become a factor that will affect the overall design and function of the building. The site falls in an eco-system named the 'sub-alpine,' which is known as an intermediate ecosystem. Many mammals pass through this area before the winter months, as to get away from the harsh winters of the upper elevations. While some animals leave, many stay and have adapted to endure the change in climate. The design will take influence from the surrounding ecosystem in a manner that will enable itself to successfully adapt in accordance to the seasonal changes.

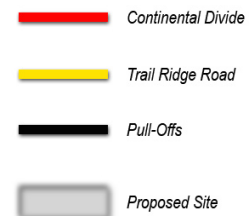
Currently this area has two pull-offs (see maps below). The first directly west of Poudre Lake on the opposite side of Highway 34. This pull-off is mainly used as a parking area for backpackers using the Bighorn Trailhead. The other pull-off is just south of the Lake. This area has 20 parking stalls and has restrooms. It also has some information regarding the Continental Divide and its importance. The pull-off also functions as a trailhead for the Ute Trail which is highly popular in the summer months.



Estimated 1/2 mile x 1/2 mile area surrounding site.



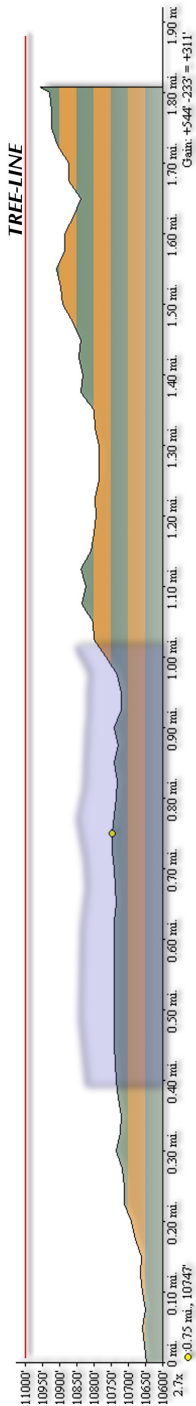
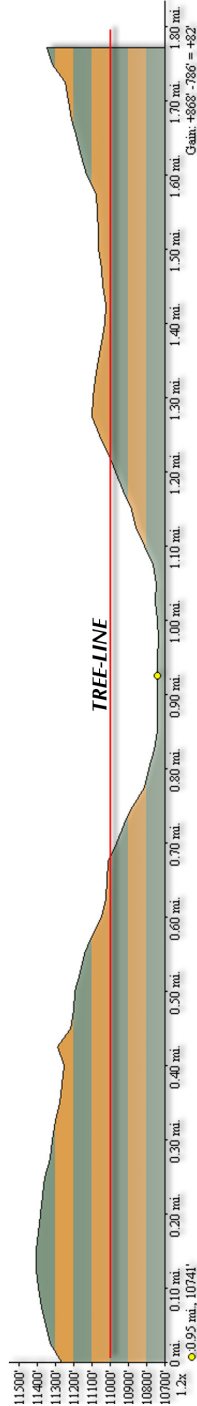
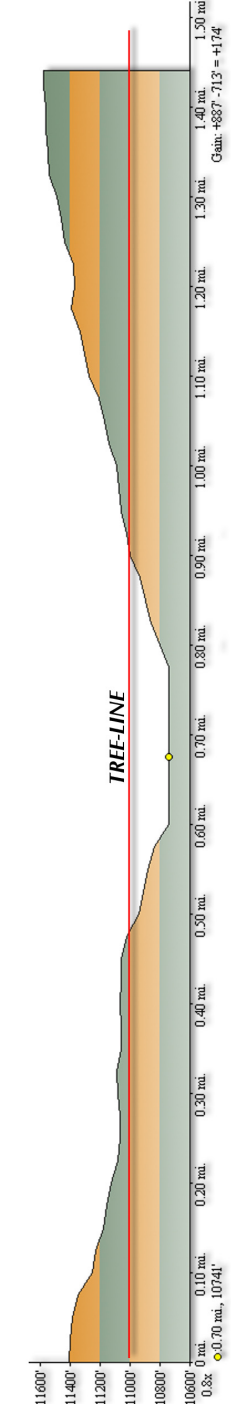
Proposed Build Site. West side of Highway 34.



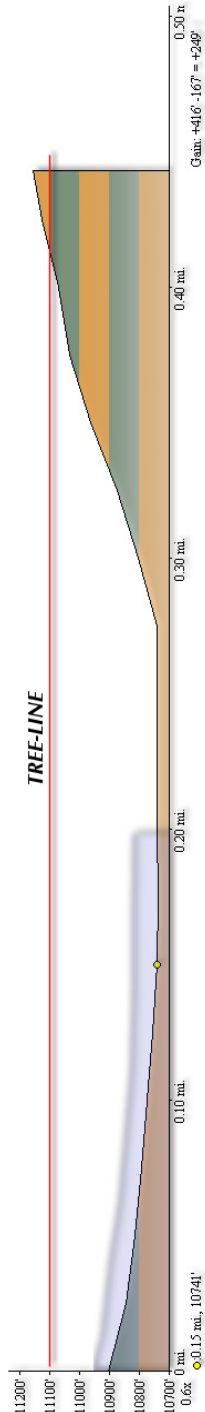
**Green denotes forested areas.
Treeline in this area is typically around 11,300 feet.

S i t e C o n d i t i o n s

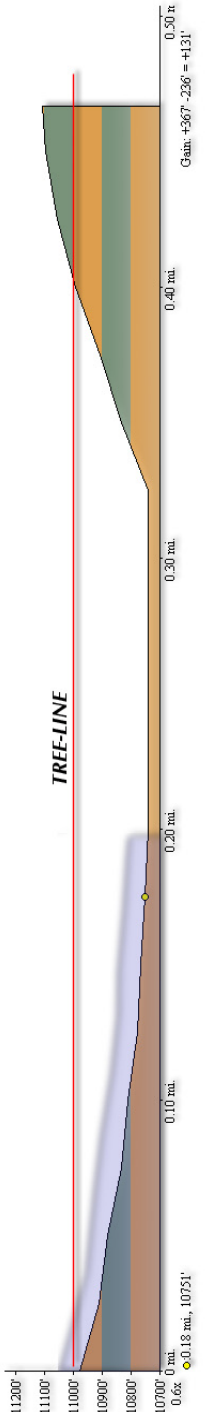
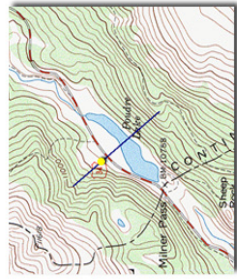
// SURROUNDING SITE SECTIONS



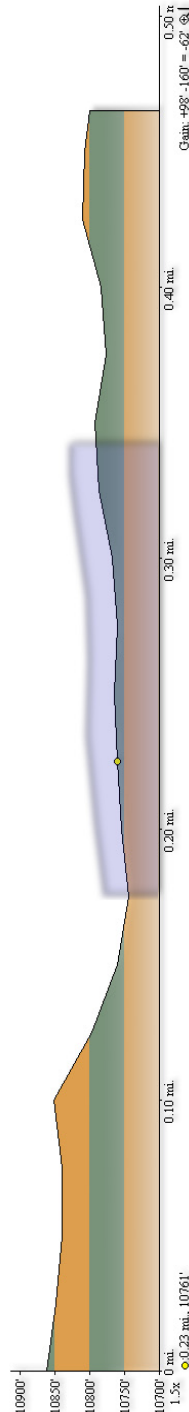
S i t e C o n d i t i o n s // LCOAL SITE SECTIONS



Rocky Mountain National Park // Milner Pass // Local Site Section 01 (0.15 miles)
The proposed site (in blue above) has a small incline. The area is among the flattest within Milner Pass.



Rocky Mountain National Park // Milner Pass // Local Site Section (0.18 miles)
The above section shows the gradual bowl shaped site where the structure will rest.

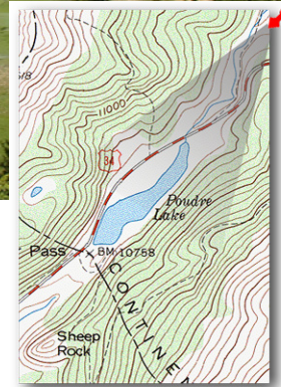


Rocky Mountain National Park // Milner Pass // Local Site Section (0.23 miles)
This section shows a slight incline from the southeast corner of the site. The structure will have to either rest on top of the multiple grade changes or actually bury itself into the ground.

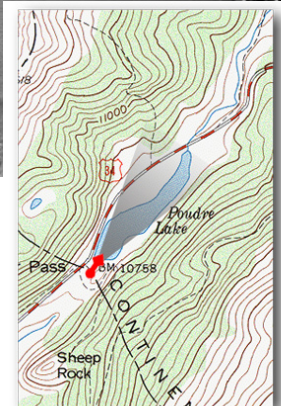
// PHOTO DOCUMENTATION OF SITE



The proposed site allows for the actual structure to remain hidden upon entrance from both directions into Milner Pass. This will allow for the site to remain natural from a landscape perception.



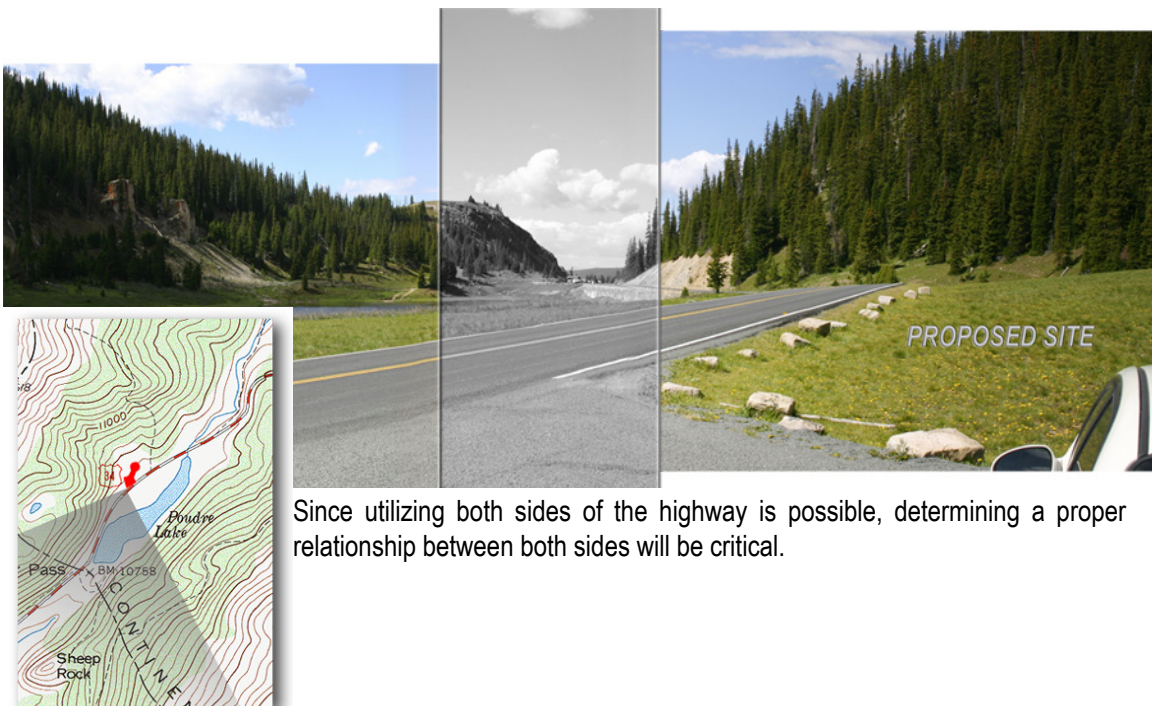
The site also allows itself the possibility to utilize a portion of land that is across the highway. Although this area sees water in the early spring when snowmelt begins.



// PHOTO DOCUMENTATION OF SITE



The site has the ability to utilize the existing protective abilities of the forested mountainside or separate itself from it.



Since utilizing both sides of the highway is possible, determining a proper relationship between both sides will be critical.

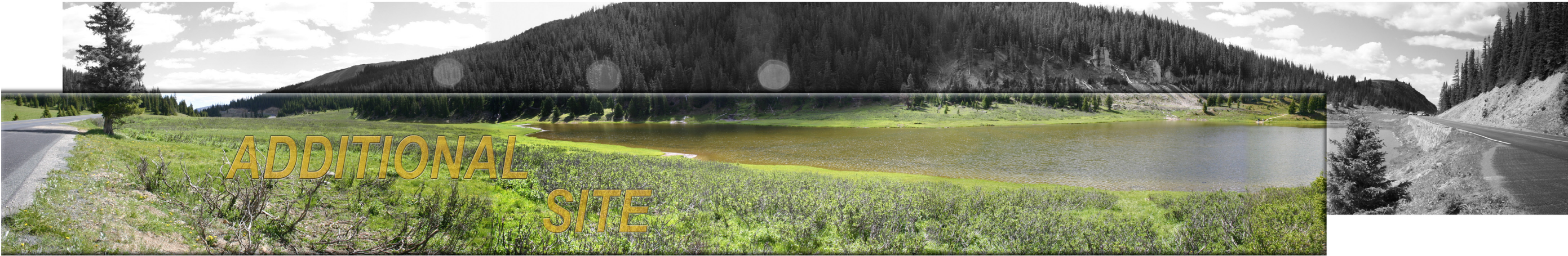
// PHOTO DOCUMENTAION OF SITE



MILNER PASS // LOOKING AT SITE (180 DEGREES SOUTH TO NORTH)

Besides being located near the Continental Divide, the site also is a very popular trailhead for backcountry backpackers. The Cache LaPoudre River Trailhead can be seen at the far right of the picture. Curenly there is a pull-off for backpackers to leave their vehicles.

Also, the obvious treeline highlighted by the top of the colored strip above will become an important boundary for the actual construction of the building. The clear forest line appears because on cooler nights the colder air settles at the lowest portion of the pass, making it hard for seedlings to develop since they are extremely susceptible to frost.



MILNER PASS // LOOKING AT ADDITIONAL SITE & POUDRE LAKE (180 DEGREES NORTH TO SOUTH)

The type of vegetation that is growing in the highlighted area typically means that the soil there is extremely moist and fertile. This implies that the water level of the Poudre Lake is much higher in the early portions of spring when the snow in the area first starts to melt. Looking down the road to the south (right end of the above picture) shows that the road is actually built up holding back the water during the early spring. Since the water level rises to this level, if this portion of the site is to be used, the structure might have suspend itself over the ground as to stay dry during snowmelt.

// PHOTO DOCUMENTAION OF SITE



MILNER PASS // LOOKING NORTH AT CONTINENTAL DIVIDE PULL-OFF
The Pull-Off has 20 parking stalls and restroom facilities. Lake Poudre can be seen in the background as well as the proposed site.



MILNER PASS // LOOKING NORTH AT FACILITIES
The only building within Milner Pass (restroom facilities).








MILNER PASS // LOOKING SOUTH AT CONTINENTAL DIVIDE PULL-OFF
Parking area with restroom facilities in the distance.



KAWUNEECHE VALLEY // LOOKING FROM SOUTHERN MILNER PASS.
The elevation drops almost 2,200 feet from Milner Pass to Kawuneeche Valley within less than a mile.

ADAPTING TO THE ENVIROMENT: FLORA

FLORA	WINTER	SUMMER	REPRODUCTION	FIRE	MISC.
 Ponderosa Pine -coniferous	1. Coniferous trees have developed needles as a resilience to snow. It allows the packed snow to slip off the branches of the tree.	1. The tree develops a large taproot early in its gestation in order to grasp as much moisture as it can from a wide area. (3" seedling can have 2' lateral roots.)	1. The Ponderosa Pine, along with most coniferous trees, produce a good seed crop over 4-6 years. It also relies on good moisture within the soil; both don't happen but every 25-30yrs, but with its life expectancy at over 450 yrs, the chances are good that it will reproduce many times.	1. Old growth develops a thick bark that defends itself even through intense wildfire, growth burns.	
 Aspen -deciduous	1. Aspens enter a period of dormancy that starts in the late autumn when the color of the leaves change and fall to the ground allowing for the snow slip from the tree and not collect.	1. The Aspen's extensive root system allows for the above ground portions of the tree to sustain damage from herbivores, lightning, and insects that tend to destroy its tough bark that surrounds the tree.	1. The Aspen has developed not to rely on seedlings for reproduction. Most Aspen trees regenerate by sending up suckers , seedlings that grow from the base of the tree in the soils, which is not usually attained in the areas of RANP.	1. The Aspen actually depends upon wild-fires, insects, and browsing by larger herbivores in order for reproduction. The Aspen's root system enables everything above ground to basically die (i.e. in a fire) and still reproduce a new fully healthy clone.	1. Most Aspen trees are clones of another source tree; a product of reproduction by vegetative growth. They are all connected from a line of trees that has been successful within its stand.
 Lodgepole Pine -coniferous	1. The Lodgepole Pine poses a narrow crown, with branches that spray downward, enabling snow to be shed as it packs itself onto the tree. 2. They also grow in groups at higher elevations; creating their own microclimate protecting themselves from the wind, snow, etc.	1. The lodgepole pine has adapted allowing itself to grow in almost complete darkness. The lodgepole pine can be found in dense stands. They are not as dependent on the summer sunlight to photosynthesize as other coniferous trees are.	1. The lodgepole pine has evolved as a fast reproducing tree. The lodgepole pine can grow in a very short period of time, it is mostly a pioneer species and can quickly take over other stands of other species. Usually they tend to be some of the first trees to create a stand after a major forest fire.	1. The lodgepole pine welcomes fires, the pine has serotinous (late developing) cones , which are coated w/ a resinous bond that prevents the scales from opening and shedding seeds until they are heated, allowing for reproduction to occur most often after a serious fire.	
 Engelmann Spruce -coniferous		1. The Engelmann Spruce and Subalpine Fir are able to photosynthesize at lower temperatures which increase its actual growth period during the summer.	1. The Engelmann Spruce has the ability to grow a new tree if a branch of one tree is planted close to the ground for an extended period of time; it is mostly a vegetative reproducer . 2. Its cones that produce effective seeds are small and light, and the levels are sufficient, both rarely coincide.	1. The Engelmann Spruce as well as the Subalpine fir usually grow at upper elevations near treelines where fires are not common. Abnornes are due to lightning at this elevation and do not cause trees to cluster with larger spaces between each grouping.	
 Subalpine Fir -coniferous					

1. Trees within the subalpine ecosystem tend to grow around open areas of grassy meadows and basins. This is due to the colder temperature that inhabit the lowest portions of a basin during the nights and mornings. Young seedling are not able to survive the frost that frequents these lower portions of valleys and basins. There is usually a clear line of trees that shows the typical frost line.






2. Most of the trees at such high elevations, as in the subalpine, help to create a **microclimate** that both allows themselves to sustain the winter weather as well as allowing protection for a much more sensitive undergrowth. The microclimate not only benefits the trees that its comprised of but also smaller plants and even animals by creating a sheltered area to reside.

The chart explains the several ways each tree has adapted to its surroundings within its given ecosystem. Each of the above trees can be found in the Sub-Alpine zone/ Milner Pass.

E c o s y s t e m I n f l u e n c e s

// ADAPTATION // FAUNA CHART

ADAPTING TO THE ENVIROMENT: FAUNA

FAUNA	WINTER	SUMMER	REPRODUCTION	MIGRATION / HIBERNATION	MISC.
 Moose -deer family	1. The moose's long legs enable them to move swiftly through drifted snow and wet lands. It also allows them to carry a sufficient amount of fat storage for the winter. Their legs have a thick layer of fur and an added warmth. Their thick, hollow hair is wider at the tip than at the base. The shape helps trap an efficient insulating layer of air next to their bodies.	1. The moose's pelt changes from winter to summer. During summer it consists of one layer and during the winter they grow a second layer that increases the amount of heat needed for warmth.	1. Moose give birth to usually 1-3 calves in May or June. Within two weeks, the calves follow their mother on her daily routines. They are able to keep up with her pace.	1. Typically Moose stay at elevations throughout the year that do not receive large amounts of snow. But they are capable of living at higher elevations throughout the winter due to their larger stature and limited predators.	1. In cases of deep snow, Moose are able to lift their legs almost directly straight up reducing any snow drag, allowing for nearly no extra exertion.
 Elk -deer family	1. Their winter pelt, like the moose, consists of two layer: thick, long guard hairs and a dense woolly undercoat. The winter coat also is usually many shades darker than that of the summer coat. The change in color allows for the elk to absorb more of the sun's raise in the winter keeping them warmer in the winter	1. Their highly developed digestive system allow for elk to eat almost any plant material they can find during any time of the year. During the summer months, the elk has only one layer of fur keeping it cool during the days and warm during the nights.	1. Elk give birth to a single calf nearly every May or early June. The calf usually is ready to join the her within 3-4 weeks.	1. Elk choose to leave the harsh winters and migrate to a warmer micro-climate at lower elevations. With high numbers of elk, the migration can be a major factor of the herd being forced to spend their winters at higher elevations, searching for land to graze upon.	1. The darker pelt of mountainous elk also allows them to camouflage better within their shadowy habitat.
 Black Bear -bear family	1. Bears have not developed to sustain themselves during the winter. They lack the ability both eat food available during the winter and chase adult prey through the snow.	1. Black bear adaptations to obtain and digest food are all specialized towards their form, claws, teeth, dentition, stomach structure, and digestive tract are all geared to obtain small, easily digestible foods like berries, nuts, leaves, colonial insects, and newborn animals—foods available mostly during the warm growing season.	1. Usually 2-3 cubs are born and nursed while the sow sleeps through the winter. The female then brings up to two times more than the male. By the end of the second spring, Bears typically bear young in alternate years.	1. Black Bears sleep through the winter months without eating, drinking, urinating, defecating, or moving. They have a high fat-to-mass ratio and have lower surface-to-mass domancy that the black bears induce is an evolutionary response to seasonal shortage of food as well as to cold weather.	
 Snowshoe Hare -hare family	1. The Snowshoe Hare has very large hind feet that enable it to cross areas of soft snow where other animals sink into the powder. 2. In response to shortening day lengths at the onset of winter, Snowshoe Hares start changing into their winter camouflage whether the snow falls or not.	1. During the summer and spring, the snowshoe hare has a brownish-grey coat that allows it to camouflage well within the rocks and grasses of its habitat. 2. It also stays dormant in one spot for long periods of time in order to decrease its chances of being seen by predators.	1. Usually 3-4 young are born in a litter and are born under some form of cover. The female then brings up to two times more than the male. By the end of the second spring, young are able to move around and eat like an adult.	1. The snowshoe hare stays within its familiar territory for the winter. With its color change and larger feet, it is able to move around all year with little worry of its surrounding predators.	1. Snowshoe Hares have made nearly the entire southern portion of the Rocky Mountains their home, although depending on the actual microsite, their molt from brown to white changes.
 Yellow-Bellied Marmot -squirrel family	1. The yellow-bellied marmot relies purely on hibernation in order to withstand that harsh winter temperatures and precipitation the upper elevations see throughout the winter.	1. They spend the summer months basically storing up fat in order to survive the winters in their dens. 2. Yellow-Bellied Marmots tend to form actual social societies among themselves in order to distribute tasks among a colony, increasing their chances of survival.	1. There are usually 3-8 young in every litter. Marmots actually take almost a full year to be adult size.	1. The marmot is a true hibernator . They lower their body temperature to a few degrees above the surrounding den temperature	

1. Animals within such extreme climates tend to mature very quickly. The quicker an animal can live for itself the greater the chances are for it to live as well as its parents. Being young not only brings with it vulnerability, but being a nurtured takes some of the awareness away from the parents allowing them to also become easy targets to predators.

The chart explains the several ways each animal has adapted to its surroundings within its given ecosystem. Each of the above animals can be found in the Sub-Alpine zone/ Milner Pass.

PROGRAM // PROJECT SCOPE

THE FOLLOWING PAGES CONTAIN RESEARCH USED WITHIN THE IMMEDIATE SCHEMATIC PHASE OF THE PROJECT. CONTENT FOLLOWS UNDER THESE DIVISIONS:

-PRECEDENTS - RESEARCH ANALYSIS

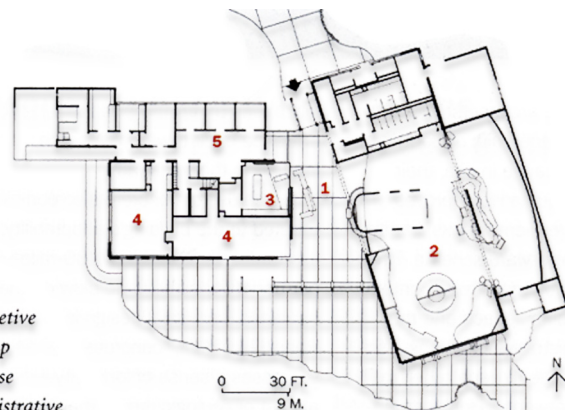
-PROGRAM DEFINITION // S.F. TAKE-OFF

-PROGRAM CONCLUSIONS // PROJECT DIRECTION

YAQUINA HEAD INTERPRETIVE CENTER (18,000 S.F.)
THE MILLER/HULL PARTNERSHIP
NEWPORT, OREGON



The design includes two separate rectangular forms that house different functions for the center. Each function, administrative and interpretive, are vital for the center to function. The design also has adapted to its surrounding by utilizing the strength of concrete to sustain its form in hurricane force winds.





The design includes two major functions, interpretive and administrative. These two programs consist of over half the total square footage of the building. The Interpretive portion of the design actually intersects the otherwise linear configuration of the structure. This space, hierarchically, becomes the most dominant from the exterior as well as from the interior.

ADJACENCY

-The design clearly has a separation between the Interpretive and Administrative areas. The Lobby acts as a buffer that mediates between the separate programs. Functionally, it becomes a division between PUBLIC and PRIVATE.

DENSE PROGRAM (CLUSTER CONFIGURATION)

-The design also mimics a clustered configuration. This configuration is commonly found in nature. In most cases it is found in extreme climates where a 'microclimate' is formed by tightly configured trees and shrubs. The clustered configuration would allow for spaces to be closer together with more structural support.



The Yaquina Head Interpretive Center lies on the edge of the Pacific Ocean, making itself susceptible to the intense winds that develop off the coast. The design, in response to the winds, took on a heavy poured-in-place concrete construction. Several concrete bearing walls are placed throughout the building, while sloped roofs allow for the wind to deflect upwards off the building.

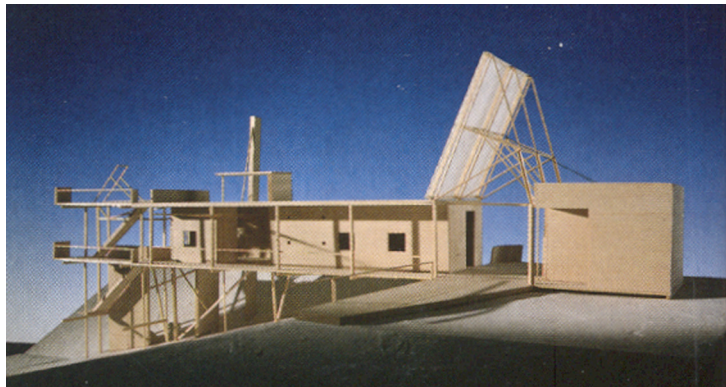
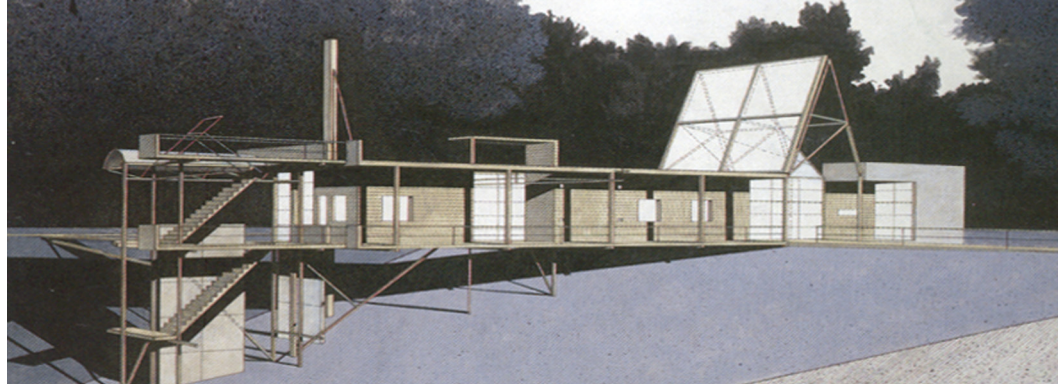
The blue areas within the two bordering images represent the concrete structure of the building. On the interior, the functionality of these walls is expressed, not hidden.

YAQUINA HEAD INTERPRETIVE CENTER (18,000 S.F.)

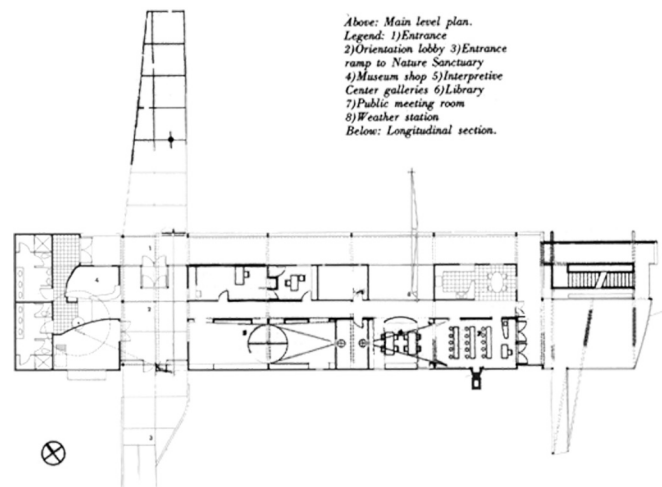
THE MILLER/HULL PARTNERSHIP

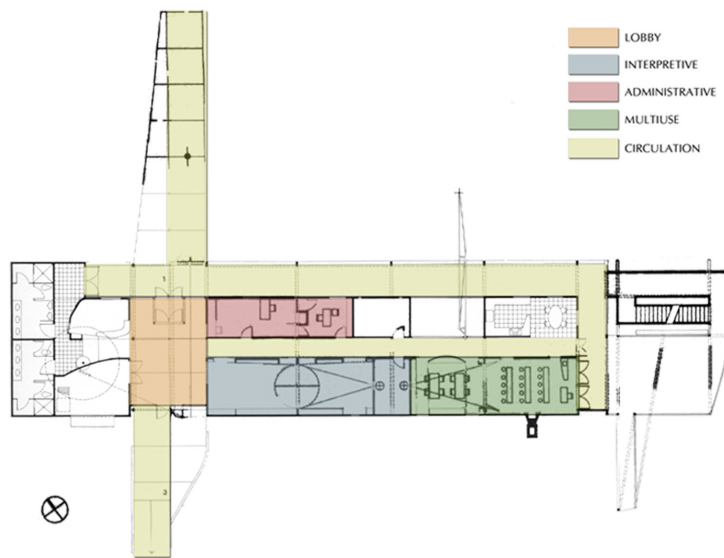
NEWPORT, OREGON

ELISE CHAPIN SANCTUARY INTERPRETIVE CENTER
THOMAS HANRAHAN AND VICTORIA MEYERS ASSOCIATES
CHATTANOOGA, TENNESSE



The building proposes a contemporary, more complex understanding of the natural world, while at the same time acknowledging that such constructions represent an 'artificial' division from an 'original' relationship to nature.



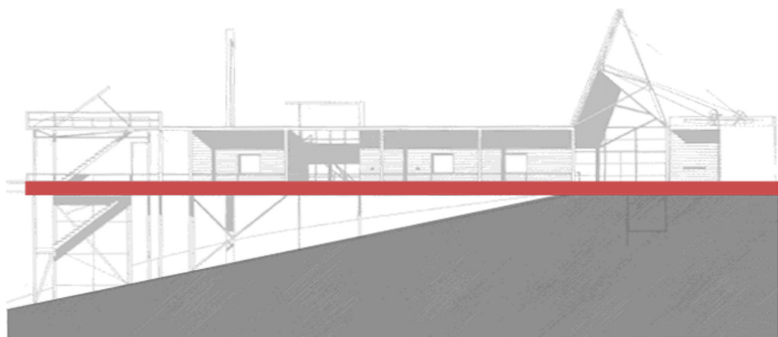


The design of the Elise Chapin Sanctuary caters mainly to the public. There are only limited administrative functions. The design is dominated by means of circulation. Walkways are spread continuously around the building, most of which wrap the exterior of the. The several walkways allow the design to become formal viewing device that stretches into the openness, extending the original grade into its bowl-shaped context. The building becomes a visual datum accentuating the drastic change in topography.

ADJACENCY

- The design clearly represents a pattern of interaction between the user and the surrounding environment. Programmatically the spaces follow a linear configuration that terminates at a lookout point. The overall usage of the building is primarily for the public. This design focuses more on the building acting as a viewing device than actual usefully configuring its interior spaces.

By allowing the structure to visibly extend itself over the falling topography, it creates an even greater visual grade change. Using the design as a datum allows the building to extend the actual grade over the falling terrain while allowing users to observe the topography from a vantage point that is otherwise unattainable. Although using this technique allows the design to become susceptible to many environmental factors, such as wind.



ELISE CHAPIN SANCTUARY INTERPRETIVE CENTER
THOMAS HANRAHAN AND VICTORIA MEYERS ASSOCIATES
CHATTANOOGA, TENNESSE

ANTELOPE ISLAND STATE PARK VISITOR CENTER (5,200 S.F.)
EDWARDS & DANIELS ARCHITECTS
SALT LAKE CITY, UTAH



A walkway that starts at the parking lot takes visitors inside. As they move along it, they get glimpses of the vistas they came to see and can branch off into the exhibit and multiuse areas. Eventually, the path takes visitors back outdoors to an impressive overlook and can appreciate endless views of the Great Salt Lake.



1. Walkway from parking
2. Bookstore
3. Exhibit
4. Office
5. Resource
6. Multiuse
7. Walkway to overlook

N 0 20 FT.
6 M.



The design takes visitors through spaces beginning on the exterior then leading them into interior spaces which are designed to explain and define the surroundings. After meandering through the building, visitors are able to exit at multiple areas enabling them to look at framed views over the surrounding vista. The building's deliberate, but sporadic, design allows the visitor to actually explore the space, but still be controlled by the surrounding organization of spaces.

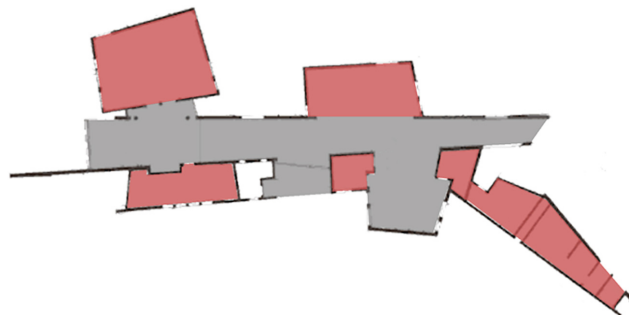
ADJACENCY

- The design has deliberately combine the spaces into a continuous and sporadic configuration that allows for the spaces to have no clear divisions but keep a coherency connected by the lobby and common pedestrian movement through the structure.

BUILDING AS A COLONY (TIGHT CONFIGURATION)

- The design follows a scattered configuration of spaces that are centrally connected by the lobby and circulation. This allows for the programs, although separated, to interact through means of the central space. It allows for the spaces to be separate and function on their own, although at the same time, function in close relation to one another.

The diagram to the right illustrates the Tight Configuration of the Antelope Island State Park Visitor Center. Program areas are spread surrounding the central space; the lobby and circulation.



ANTELOPE ISLAND STATE PARK VISITOR CENTER (5,200 S.F.)
 EDWARDS & DANIELS ARCHITECTS
 SALT LAKE CITY, UTAH

ALPINE VISITOR CENTER (****S.F.)
UNKNOWN ARCHITECT
ROCKY MOUNTAIN NATIONAL PARK, COLORADO



This center is one of the highest public facilities within the United States. It functions as both a small interpretive center, bookstore, and ranger station. The facility is, on average, open for five to six months of the year. As seen in the photo, the winter's snow can completely cover the entire building. It generally takes plows 40-50 days to clear the roads leading to the Visitor Center.



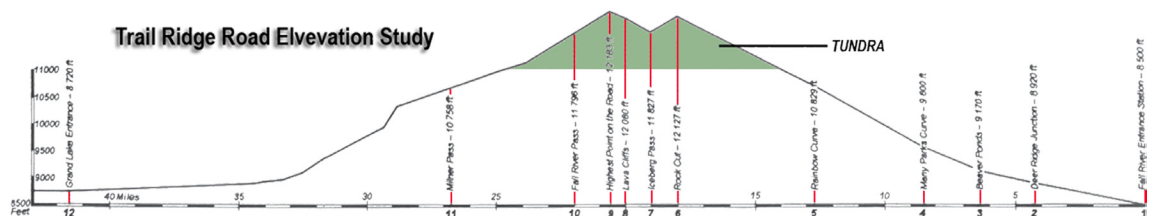


The heavy logs atop the Alpine Visitors Center are designed to withstand heavy snows and keep the roof from blowing away in fierce winter storms where winds can exceed 200 m.p.h.. The entire structure is timber framed. The other building, directly to the east, is newer and was framed using steel.



Intense heavy snows are expected every winter. The Alpine Visitor Center is strategically placed on a western facing slope as to increase snow melt from the sun. Snowcover still almost covers the entire building in the spring. To ensure that snow plows do not hit the structure, the park service places 15-25 foot wood poles to indicated the placement of the building. The same poles are seen along the upper elevations of trail ridge road, marking the edges of the road when the plows begin to clear snow in late spring.

Since the Alpine Visitor Center is one of the highest public facilities in the United States, services and utilities are an extreme design problem. The Center originally had an underground pipe system for both water and waste, but in the last 5 years, the system has been shut down and replaced by underground water tanks that are filled every couple days and waste is trucked down on a daily basis.



ALPINE VISITOR CENTER (****S.F.)
UNKNOWN ARCHITECT
ROCKY MOUNTAIN NATIONAL PARK, COLORADO

(110 ACRES) HIGHLANDS CENTER AT CAPE COD NATIONAL SEASHORE (110 ACRES)
CENTER FOR THE ARTS, SCIENCES, AND CULTURE
CAPE COD, MASSACHUSETTS

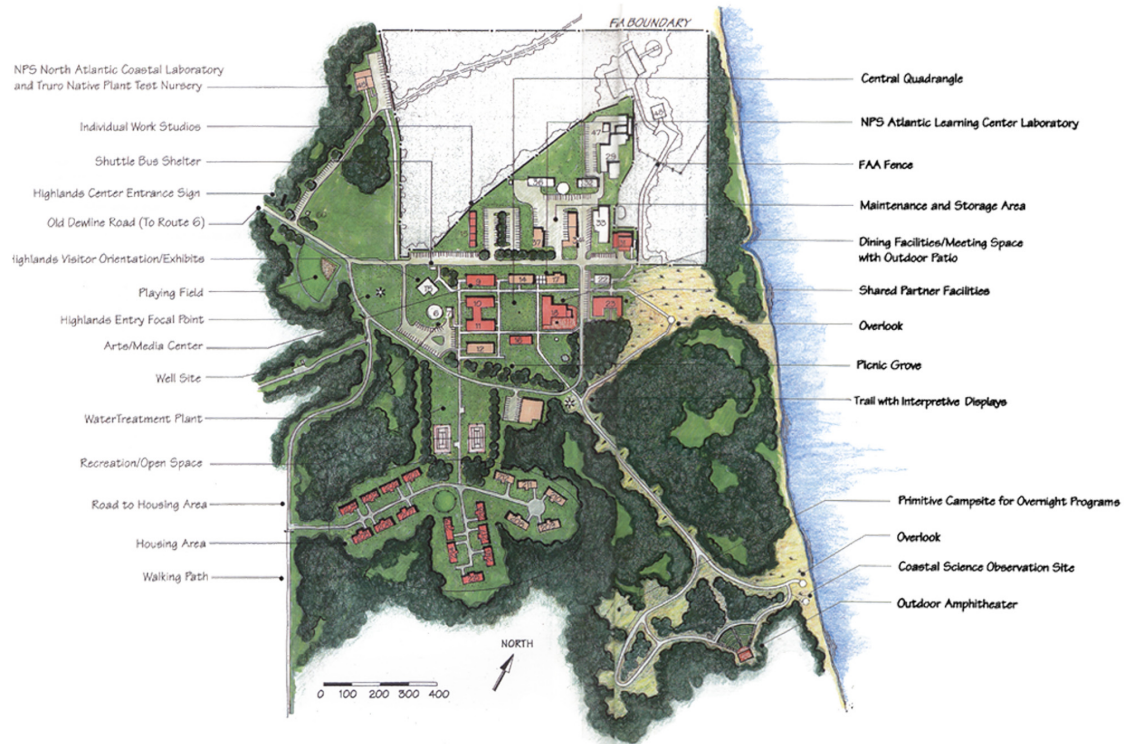


HIGHLANDS CENTER MISSION:

The Highlands Center fosters the unique cultural and natural heritage of Cape Cod by facilitating scientific research, the arts tradition, and educational programs atop the dramatic sea cliffs of Cape Cod National Seashore.



The vision of the Highlands Center is to address these goals by offering in one location the potential for exchange between community members, educators, artists and scientists.



The facility is still in the process of documenting and determining what exactly is needed for the proposed programs to function. The goals of the facility are similar to that of the proposed in this project. They are as follows:

- To provide educational, scientific, artistic, and cultural activities
- To create a collaborative and creative environment
- To attract local, regional, and national entities to fulfill the mission of the National Parks Service

Highlands Center will feature:

- Studio and exhibition spaces for artists and writers
- Laboratories to further scientific research
- Conference, classroom and performance spaces
- Recreational Spaces, Workshop areas, and Living Quarters for program participants and staff

(110 ACRES) HIGHLANDS CENTER AT CAPE COD NATIONAL SEASHORE (110 ACRES)
CENTER FOR THE ARTS, SCIENCES, AND CULTURE
CAPE COD, MASSACHUSETTS

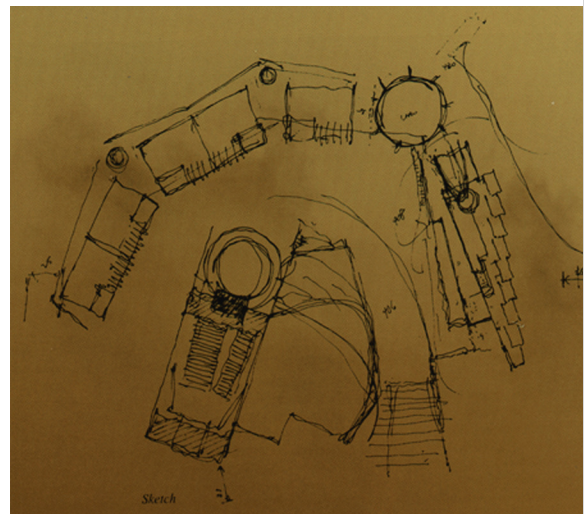
P r e c e d e n t s R e s e a r c h

THE NEUROSCIENCES INSTITUTE (56,000 S.F.)
TOD WILLIAMS BILLE TSIEH & ASSOCIATES
LA JOLLA, CALIFORNIA



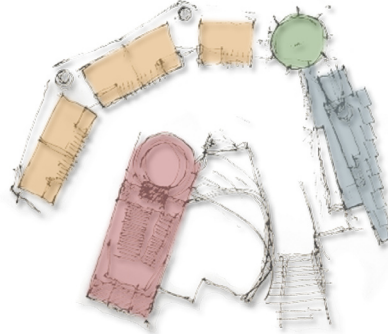
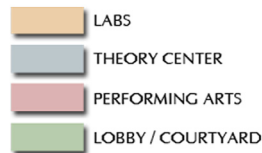
"Because creativity necessarily begins with the self, we wanted to make a place for selfish individual creators, with no rules and no politics." -- Owner, Dr. Gerald M. Edelman

The design created a place with no singular view, but many diversions into discovery through the entire complex.



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The complex of buildings, walkways, and courtyards connected by a central plaza fosters both thoughtful individual reflection and creative scientific interchange among the Institute's diverse gathering of resident and visiting scientists. The facility harbors permanent studies as well as migrant studies requiring scientists to stay at the facility.



Within the Neurosciences Center, there is little interaction between Theororists and Scientists. The intention of the design was to bring these two groups together, not in a working atmosphere, but a social one. The adjoining lobby and courtyard both were designed to bring together each discipline. The programmatic difference is evident through the exterior facade as well as in plan. The theory center is mainly enclosed with little exposure to the outside while the lab areas are exposed, through glass, to the outside.

The building sits within a hill. The Performing Arts portion of the building is actual built into the ground while tunnels reach back to the labs and theory center. The building redefines the actual grade of the site then eventually re-connects by sinking the auditorium.

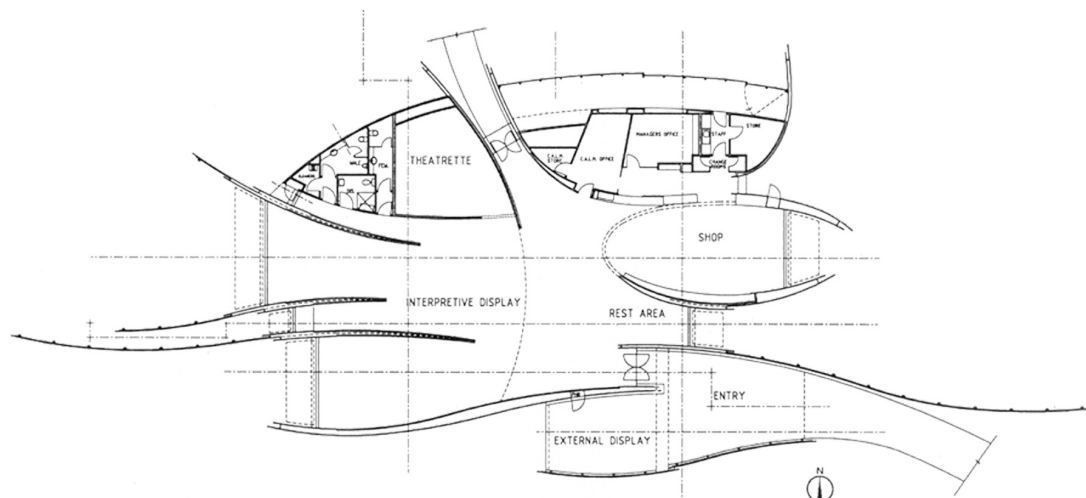
Located on Torrey Pines Mesa in La Jolla, California, The Neurosciences Institute is a not-for-profit research center dedicated to "high risk - high payoff" research designed to discover the biological basis of higher-level brain functions in humans.

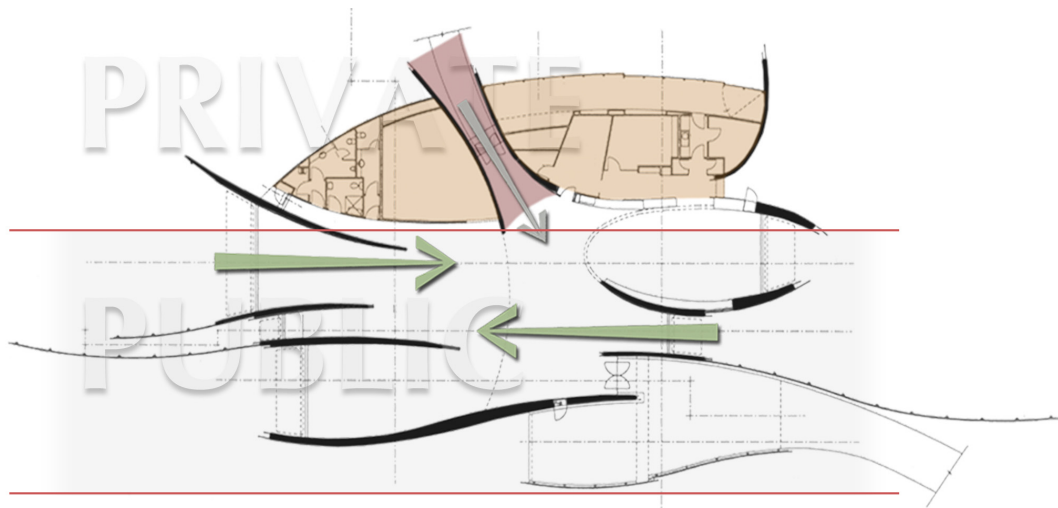
THE NEUROSCIENCES INSTITUTE (56,000 S.F.)
TOD WILLIAMS BILLE TSIEN & ASSOCIATES
LA JOLLA, CALIFORNIA

KARJINI NATIONAL PARK VISITOR CENTER
WOODHEAD INTERNATIONAL
KARJINI, AUSTRALIA



Echoing the undulations of the site, the form of the building is generated by a series of curved free-standing walls. The serpentine walls engage the user to peer towards carefully calculated vistas that surround the site while at the same time, creating a sense of planned movement within the structure.





The Karjini Visitor Center has been carefully designed in order to direct visitor through the building a fairly linear passage. Although the intended path is linear the formal qualities of the spaces are softly curved in order to encourage interaction with both the design and its surroundings. The only intersection of the linear form is the back entry to the building where the hall directs visitors in an opposite direction into the landscape, or into the building. Entry/Exit against the direction of the interior movement (highlighted in red) allows for the user to experience the intensity of the actual linear qualities of the interior.



FORMAL SIMILARITIES

- The design follows the same formal qualities of circulation that the proposed project will entail. The interjection of the entry/exit relationship (red shaded area) will become the actual circulation between the artists and scientists working areas and dwellings. The orange shaded areas represent areas that could react in a manner that the actual studios and labs in the proposed design will react to the environment and the interior form of the structure.
- The design consists of two layers: PUBLIC and PRIVATE. This layering is similar to what will be desired in the proposed project. Although there is little intermixing of these two divisions that effectively crosses through the linear qualities of the design.

KARJINI NATIONAL PARK VISITOR CENTER
WOODHEAD INTERNATIONAL
KARJINI, AUSTRALIA

// S.F. ANALYSIS

As stated in the project abstract, the design project entails the integration of the arts and sciences to create an educational center for the public to learn about the Continental Divide and the surrounding ecosystem. The intention is to design a building that exhibits an expression of its adaptability to climactic conditions and plays an interactive role in how one perceives the surrounding environment. The mixing of both art and science will allow for the building to become a viewing device that will adapt to the site's multiple elements in a manner that can induce a clear educational environment. Both disciplines will converge on a common space (Interpretive Center) that will act as a showcase for the work that is researched and developed.

The design project will entail re-locating and expanding the artist's residency program that currently exists in the Park and also creating a research facility that will be available for continuing studies. Both facilities will overlap into a single space (i.e. Interpretive Center) that will share their work with the public. The 'mutual' space will be considered as an educative area that will combine both disciplines in order to teach the public about the surrounding ecosystem(s).

Major spaces can be broken into three major divisions: **Artists Residences/Studios**, **Scientific Laboratorial Spaces/ Housing**, and an **Interpretive Space** with appropriate administrative offices. The design will relocate the current Artist-In-Residence program as well as house offices for the Continental Divide Research Center. Areas within the three major headings will be further explained throughout the following pages.

ARTISTS RESIDENCES/STUDIOS:

"The finished artwork will characterize Rocky Mountain National Park for present and future generations, and offer the park visitor and the general public an opportunity to see our heritage through the eyes, and ears of the contributing artists" -Current Artist-Residency Program

Currently 1-2 artists stay at the parks facilities for a two week duration. The artists are spread out throughout the summer since the current facilities do not allow for multiple tenants. The facility only has one bedroom with a small kitchen and minor amenities, and no designated studio space. The new facility will enable multiple artists to stay in the park, allowing for interaction between them, in the hope to promote outstanding donations by each artists as well as possible collaborations or team work.

Proposed Artists Wing:

5- Living Units, w/ 1 bedroom**	5 @ 700 s.f.	1- Commons Area/Lounge	1 @ 450 s.f.
5- Adjacent Studio	5 @ 200 s.f.	2- Display Spaces	2 @ 400 s.f.
5- Outdoor Space (i.e. patio/deck)	5 @ 100 s.f.	1- Laundry Facilities	1 @ 150 s.f.
	950 total s.f. @ 5 units		1,400 Total S.F.
	5,000 Total S.F.		

Artists Wing Total Area: 6,400 S.F.

** Living spaces may be built forms or possibly Recreational Vehicles purchased by the NPS.

// S.F. ANALYSIS

SCIENTIFIC LABORATORIAL SPACES:

Currently there are no facilities within the park that are able to house any libratory studies. There is a facility 6 miles north of Estes Park (McGraw Ranch Research Center) that houses many of the scientists and research that is done within the park. This facility is extremely rustic as well as removed from the actual park.

The design intention would be to actually re-locate parts of the current facility (some housing, laboratories, and offices) to the Milner Pass area. This would allow for easier and shorter transportation for the researchers as well as a place that they can stay and live within the environment in which they are studying. Currently there are over 50 different research studies in progress within the park, many of which focus on the Continental Divide. Most of the research focusing on the divide is done through the Continental Divide Research Center (CDRC). The CDRC presently uses the McGraw Ranch as its base headquarters even though its location is removed from the park. The proposed design would allow space for the CDRC as well as allow space for scientists to stay during their research.

Presently, McGraw Ranch can house 10 people. Living units are of varying sizes and occupancies range from single occupancy to shared cabins. The new facility will house both lodging facilities as well as laboratories for 8 people since the facility will mainly cater to researchers working within the area of Milner Pass and the Continental Divide.

Proposed Laboratorial Wing:

8- Living Units**		1- Commons Area/Lounge	1 @ 450 s.f.
2- shared units (1 bath)	2 @ 1000 s.f.	1- Meeting Space (office)	1 @ 400 s.f.
4- 1 bedroom units	4 @ 750 s.f.	2- Laboratories (internet, proper utilities)	2 @ 1000 s.f.
8- Outdoor Space (i.e. patio/deck)	8 @ 100 s.f.	2- Offices Spaces (Director & Coordinator)	2 @ 120 s.f.
	<u>4,000 Total S.F.</u>	1- Utilities Areas (server, supplies)	1 @ 300 s.f.
		8- Storage Spaces	8 @ 100 s.f.
			<u>4,190 Total S.F.</u>

Laboratorial Wing Total Area: 8,190 S.F.

** Living spaces may be built forms or possibly Recreational Vehicles purchased by the NPS.

// S.F. ANALYSIS

INTERPRETIVE CENTER:

As stated within the project intent, “the project entails the integration of the arts and sciences to create an educational center for the public.” The idea is that both the Laboratorial Spaces and the Artists Spaces are kept separate but share a common space that overlaps the both disciplines. This space will be an area the will be defined programmatically as the ‘Interpretive Center.’

Presently, the Park has three major visitor centers, two of them at entrances and one at the peak of Trail Ridge Road. Each of these Visitor Centers serves as a place where the public can gather information about the park as well as speak to park rangers. Each visitor center also has a small gift shop. There is only one true ‘Interpretive Center’ within the park, the Moraine Park Museum.

The Moraine Park Museum functions as an ad hoc Interpretive Center for the park. The facility sits on the east side of the Divide, nearly 45 miles from Milner Pass. The museum functions as an educational tool explaining everything from the formation of the surrounding mountains to individual ecosystem identities. The Center also has an interactive trail that allows the public to walk through the valley and discover different plants and animal types that are commonly found within the park. The museum however, does not make much mention of the Continental Divide nor does it display any current scientific information that is being researched within the park.

Placing a new center on the other side of the park (Milner Pass Area) will enable many people to expand their knowledge about the entire park as well as be current with information that is effecting or changing the park. The centers’ are about creating awareness of your surrounding environment. The best way to do that is to enable interaction with the environment itself as well as developing a line of communication that also informs the public about what they are experiencing and how unique it really is.

In the case of the proposed design, the artists residences and the scientific laboratories will surround a space that will designated as one for interaction and interpretation. The space will allow for both disciplines to display their works in order to educate the public about their surroundings. The central space will become a space of intermixing ideals both science and art.

Proposed Interpretive Space:

Public Display Space (Interpretive Cntr.)	3,500 s.f.	Administration (offices space, front desk)	1,200 s.f.
Bookstore	1,000 s.f.	Kitchen/Dining Space	1,200 s.f.
Outdoor Space (i.e. patio/deck)	1,500 s.f.	Lobby	700 s.f.
Multiuse (meeting/presentation)	2,000 s.f.	Interpretive Nature Trail (indoor/outdoor)	

Interpretive Space: 11,100 S.F.

// PROJECT DIRECTION // ENVIRONMENTAL INFLUENCES

THE FOLLOWING CRITERIA DEFINES AND OUTLINES CONCEPTUAL / SCHEMATIC DESIGN FOR THE NEXT PHASE OF THIS PROJECT. THE CRITERIA WILL BECOME A SOURCE OF DIRECTION FOR THE DESIGN OF THE INTERPRETIVE CENTER AND ITS ADJACENT PROGRAMS.

1-

BUILDING WITHIN CLUSTERS: It is rare that you see a standalone tree in upper elevations. Trees tend to support each other in the extreme environment, once clustered together they can form a sort of 'microclimate' that increases the chance of their livelihood but also other plants and animals living beneath them.



Conclusions:

- Since most trees have adapted themselves to sustain life by clustering one might consider keeping a group of buildings either covered, or in some way protected, by a dominant building.

In the case of the interpretive center and living units, the main center would either contain or hold support for the living units. The main building would basically re-create a man-made microclimate for the adjacent program.

- Create a hierarchical recession with the buildings masses, allowing for protection of the small masses within the larger ones, as trees do at upper elevations to sustain life.

2-

BUILDING AS A COLONY: In somewhat the same manner as building with clusters, this idea stems from the colony type behavior that many rodents and squirrels use in order to protect themselves from predators as well as the climate. These animals divide themselves into a hierarchical managing system. They divide tasks amongst themselves in order to protect the group rather than just protecting a single animal. This increases their chances of survival as a species (not as single animals).



Conclusions:

- As with the clusters above, the buildings could have a main unit that supports the others, possibly a centralized location amongst the others. This would allow for an easy transfer of services between all separated units.

- If the buildings are scattered, there would still be a common space or linkage back each other or back to a single centre.

// PROJECT DIRECTION // ENVIRONMENTAL INFLUENCES // CONT.

CONSTRUCTION WITHIN NATURE: Within the area of Milner Pass, trees have created a clear line at both the western and eastern edge of the pass. The line has naturally occurred for a reason; mainly do to the cool temperatures that the area receives at night when the cold air sinks to the lowest portions of the pass. Seedlings cannot sprout in conditions of frost, so most trees do not survive (creating the clear edge of trees).

3-
forest, using the

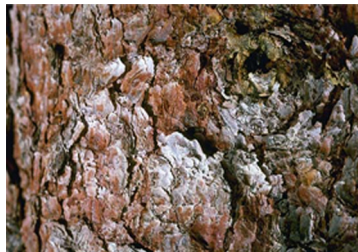


Conclusions:

- The structure itself could reside purely within the microclimate that the trees create to help support the building.
- The structure could also place itself away from that line, and develop itself as a separate piece from nature. This would mean that the building would have to protect itself, creating its own microclimate.
- The building could take advantage of a portion of the existing forest and branch itself out into the open spaces of the pass.

4-

THICK OUTER LAYER: Both Moose and Elk help protect themselves by growing a thicker pelt in the winter. During summer months, they both only have one layer of hair, and the color is lighter than it is in the winter. In the fall, they begin to simultaneously shed the summer coat and grow their winter coat. The winter coat is also darker in color as to absorb more of the sun's rays to keep them warm. Most trees in the upper elevations also have a protected layer of bark that enables themselves to sustain higher heat in a fire, in turn not burning or killing the entire tree in a fire.



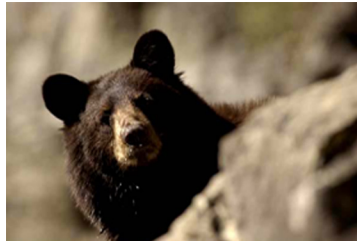
Conclusions:

- The design will have to include techniques for better insulation for the late fall months. Since the building will only be open for 6 months of the year, the building walls will have to deal more with sustaining the structure rather than keeping it warm during the winter.

// PROJECT DIRECTION // ENVIRONMENTAL INFLUENCES // CONT.

5-

MIGRATION/HIBERNATION: Each animal/plant of the subalpine ecosystem deals with the onset of winter a bit differently. Some have developed mechanisms that allow them to thrive in winter conditions, while others tend to migrate to lower elevations where conditions are more favorable. Some animals, such as the Black Bear and many rodents, enter a period of dormancy or hibernation since they are not suited to live in the



Conclusions:

- *The building(s) possibly could break down into a smaller more tolerable mass that would be able to endure the winter with less damage. The building could be collapsible, or even a kit of pieces that is taken down the pass before winter.*
- *The design could also break down and could be stored in designated areas of the site. Then re-assembled in the spring when conditions are better.*
- *Or, the structure itself is designed with enough integrity that it will be able to withstand the extreme conditions (snow, wind, etc.). It could still somehow 'winterize' itself in order to further protect itself when there are no occupants, but would still stay intact.*

6-

ADAPTING TO FIRE: Many trees have developed ways of ensuring that their species will always thrive. Even in cases of devastating fires. Many coniferous trees aren't able to seed unless there is an intense amount of heat present; this ensures that the seeds are held until a time when they are actually needed. And usually after a fire, the soil becomes extremely fertile due to all the waste that was burned and dies, which increases the chances of the seedlings to sprout and grow. Much of the old-growth can actually sustain an intense fire as well. The older the tree, the thicker the bark becomes. Aspen trees also depend on suckers to create new trees when the above ground tree dies or is burned. As long as the roots are intact, a stand of Aspen usually will thrive.



Conclusions:

- *There is no way to fully ensure protection of building in fire. But since fires within the area of Milner Pass tend to usually be spot fires caused by lightning, the intensity is not as high as many that occur at lower elevations, which increases the chances of a building to sustain a fire. In order to do so, the optimal site for the buildings is away from the treeline or perhaps integrated into the ground.*

// PROJECT DIRECTION // ENVIRONMENTAL INFLUENCES // CONT.

7-

GROUND AS A DATUM: As a means of protection, the ground is extremely important for the survival of many plant and animal species. The ground for most trees is where most of the root systems thrive, and in most cases, if the above ground portion of the tree sustains heavy damage from fire or wind, chances are as long as the root system is still intact, the tree will still survive. In the case of many animals, the ground is a place for retreat during the night as well as the winter. The ground gives them warmth as well as protection from predators.



Conclusions:

As a means of protection, the ground is extremely important for the survival of many plant and animal species. The ground for most trees is where most of the root systems thrive, and in most cases, if the above ground portion of the tree sustains heavy

damage from fire or wind, chances are as long as the root system is still intact, the tree will still survive. In the case of many animals, the ground is a place for retreat during the night as well as the winter. The ground gives them warmth as well as protection from predators.

CONCEPTUAL DESIGN & PROCESS

THE FOLLOWING CHAPTER STARTS WITH THE PRESENTATION OF THE CONCEPTUAL STAGE OF DEVELOPMENT. THE PROJECT FACED A BLIND REVIEW AT THE END OF THE FALL SEMESTER, THIS CHAPTER WILL PRESENT THE IMAGES FROM THE BLIND CRITIQUE AS WELL AS THE PROCESS THAT LED TO THE CONCEPTUAL PRESENTATION.

-CONCEPTUAL DESIGN PRESENTATION

-PROCESS AND EXPLANATION

-BLIND CRITIQUE COMMENTS

THIS CHAPTER WILL BEGIN BY THE PRESENTATION OF ALL WORK DEVELOPED FOR THE BLIND CRITIQUE AT THE END OF THE FALL SEMESTER. PROCESS WORK THAT LED TO THE PRESENTATION WILL BE REVIEWED LATER IN THIS CHAPTER.

TERMINAL PROJECT BRIEF // 12.13.04

/1ST SEMESTER REVIEW.DOC

STUDENT: KURT CISAR

MENTOR: MARK HOISTAD

"INTERPRETING A DIVIDE"

PROJECT INTENT:

THE DESIGN PROJECT SEEKS TO ESTABLISH AN INSTITUTION IN WHICH ART AND SCIENCE ARE JUXTAPOSED TO CREATE AN INTERACTIVE EXPERIENCE ALLOWING THE VISITOR TO 'SEE' THE NATURE OF THE LOCAL ENVIRONMENT. THE INTENTION IS TO DESIGN A BUILDING THAT EXHIBITS AN EXPRESSION OF ITS ADAPTABILITY TO CLIMATIC CONDITIONS, AS LEARNED FROM STUDIES OF THE LOCAL FLORA AND FAUNA, AND PLAYS AN INTERACTIVE ROLE IN HOW ONE PERCEIVES THE SURROUNDING ENVIRONMENT. THE MIXING OF BOTH ART AND SCIENCE WILL ALLOW FOR THE BUILDING TO BECOME A VIEWING DEVICE THAT WILL ADAPT TO THE SITE'S MULTIPLE ELEMENTS IN A MANNER THAT CAN INDUCE A CLEAR EDUCATIONAL ENVIRONMENT.

THE DESIGN HAS BECOME A PLACE WHERE EACH DISCIPLINE (ART AND SCIENCE) CAN PRESENT THEIR 'VIEW' OF THE SAME SETTING, THE CONTINENTAL DIVIDE, IN ORDER TO ENABLE VISITORS TO GAIN A RICHER UNDERSTANDING OF THEIR SURROUNDINGS. BOTH DISCIPLINES INTERWEAVE ON A COMMON SPACE (INTERPRETIVE CENTER) THAT ACTS AS A SHOWCASE FOR THE WORK THAT IS DEVELOPED.

THE FOLLOWING IS A LIST OF OBJECTIVES THAT ARE INTEGRAL TO THE DESIGN OF THIS EDUCATIONAL FACILITY:

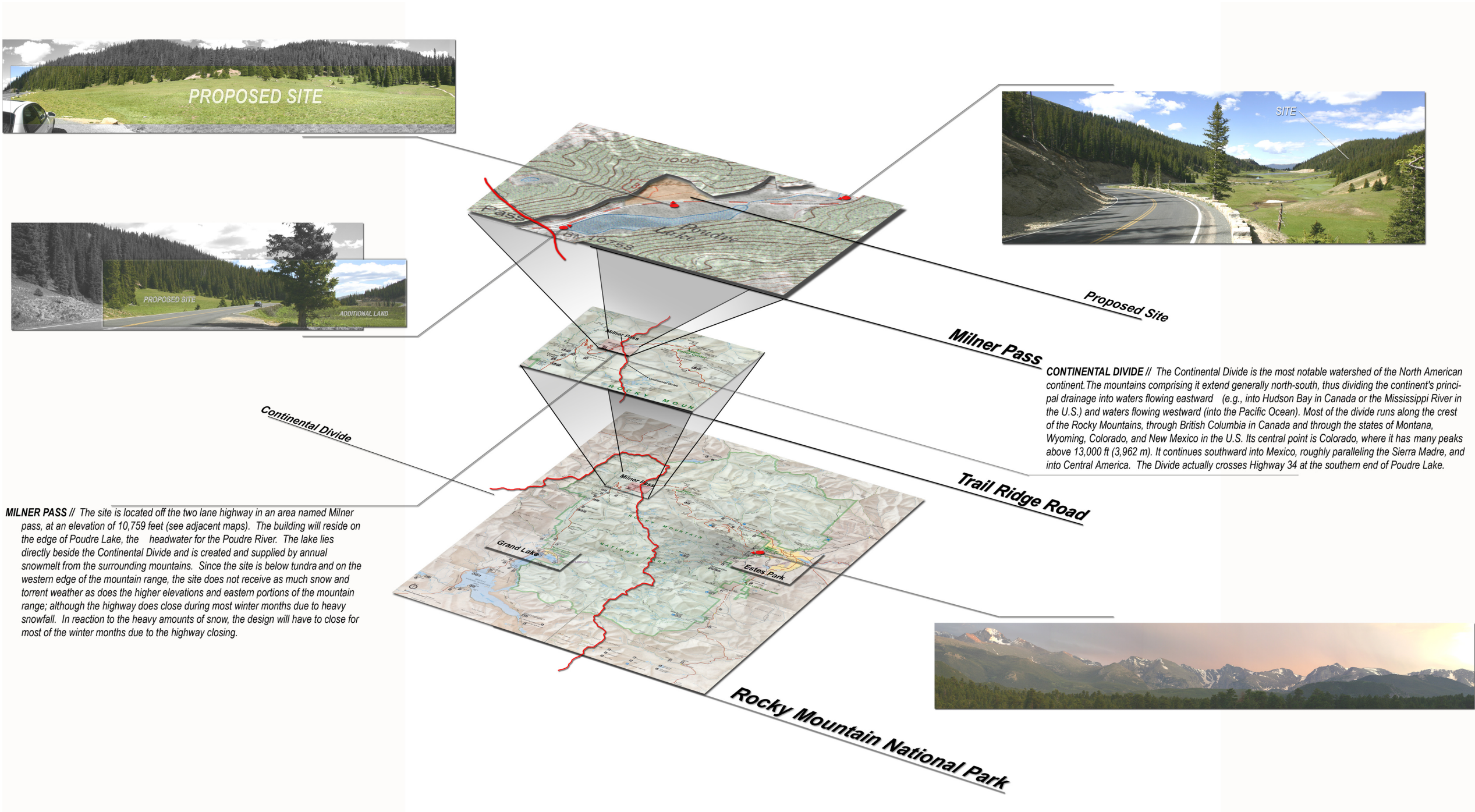
- THE PROJECT SEEKS TO LEARN FROM THE SURVIVAL STRATEGIES OF THE PERMANENT RESIDENTS OF THE SITE (LOCAL FLORA AND FAUNA) AND HOW THEY DEAL WITH THE EXTREME CLIMATE. LESSONS INTEGRATED INTO THE PROJECT CONSIDER UTILIZING THE GROUND PLANE AS A FORM OF PROTECTION, MIGRATION AT THE TURN OF SEASONS AND A SKIN THAT ADDRESSES CHANGING CONDITIONS.
- DEVELOP FORMAL QUALITIES THAT ENABLE THE ARCHITECTURE TO BECOME A VIEWING DEVICE IN ORDER TO ENHANCE THE LEARNING PROCESS AND INTERACTION WITHIN THE SURROUNDING CONTEXT THROUGH ORIENTATION AND ARTICULATION. (STUDIO/LAB SPACE)
- EXPLOIT THE EXISTING THRESHOLD (TREELINE) TO DEVELOP A FRAMEWORK FOR MULTIPLE FORMS OF INTERACTION THAT RELATE TO THE OPEN/DENSE CONDITION OF THE EXISTING TREE-LINE (I.E. WORK/LIVE, TEMPORARY VS. PERMANENT, SCIENCE/ART).



OVERALL SITE MAP // Poudre Lake is located at the center of the map. The green portion represents forested areas, mainly consisting of lodgepole pines. The immediate site rests at 10,759 feet above sea level.

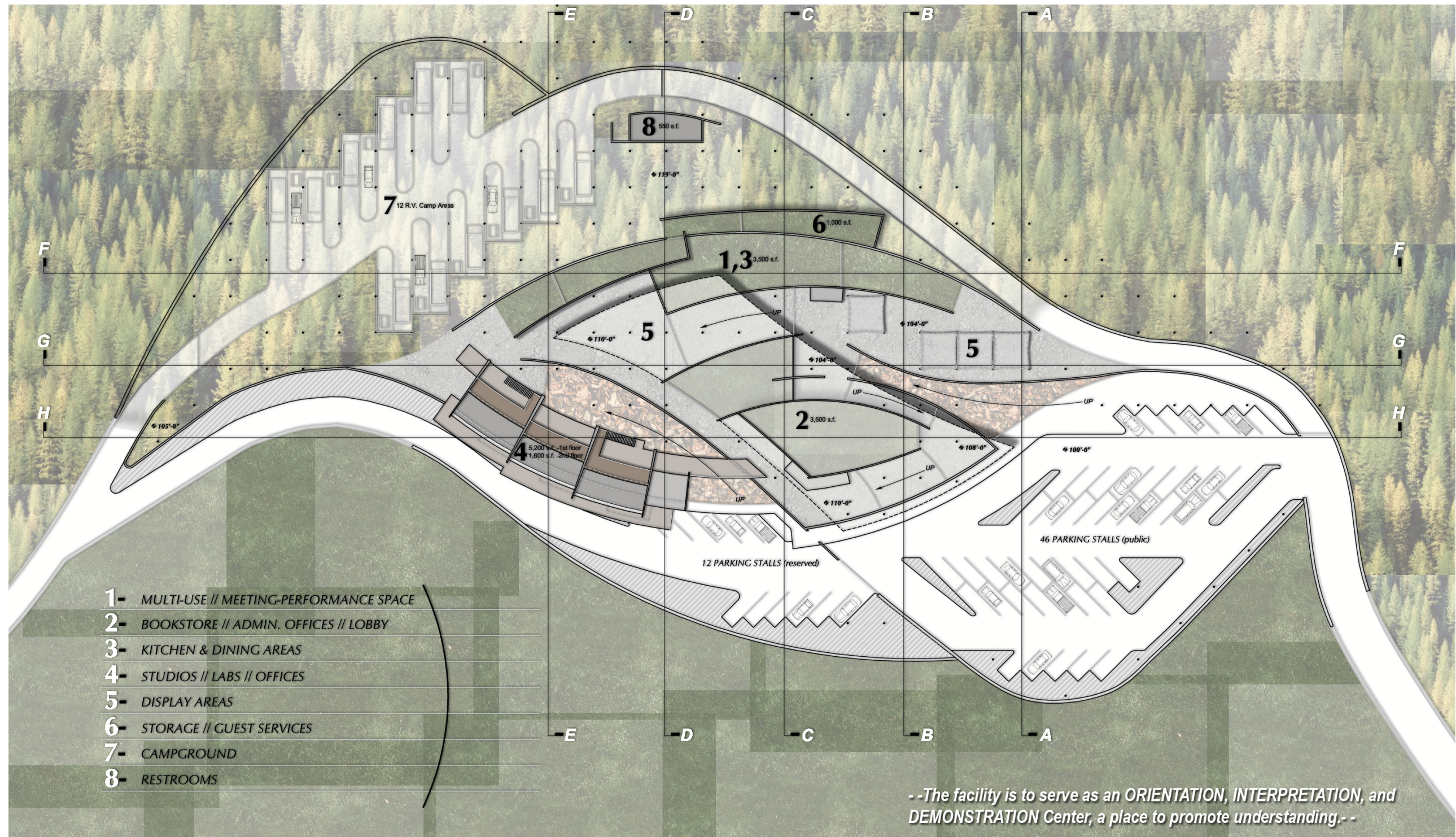
C O N C E P T U A L D E S I G N

// BLIND REVIEW PRESENTATION WORK



SITE CONTEXT // The above image shows the relationship of the site to that of the entire park. Milner Pass is located between Estes Park and Grand Lake, Colorado.

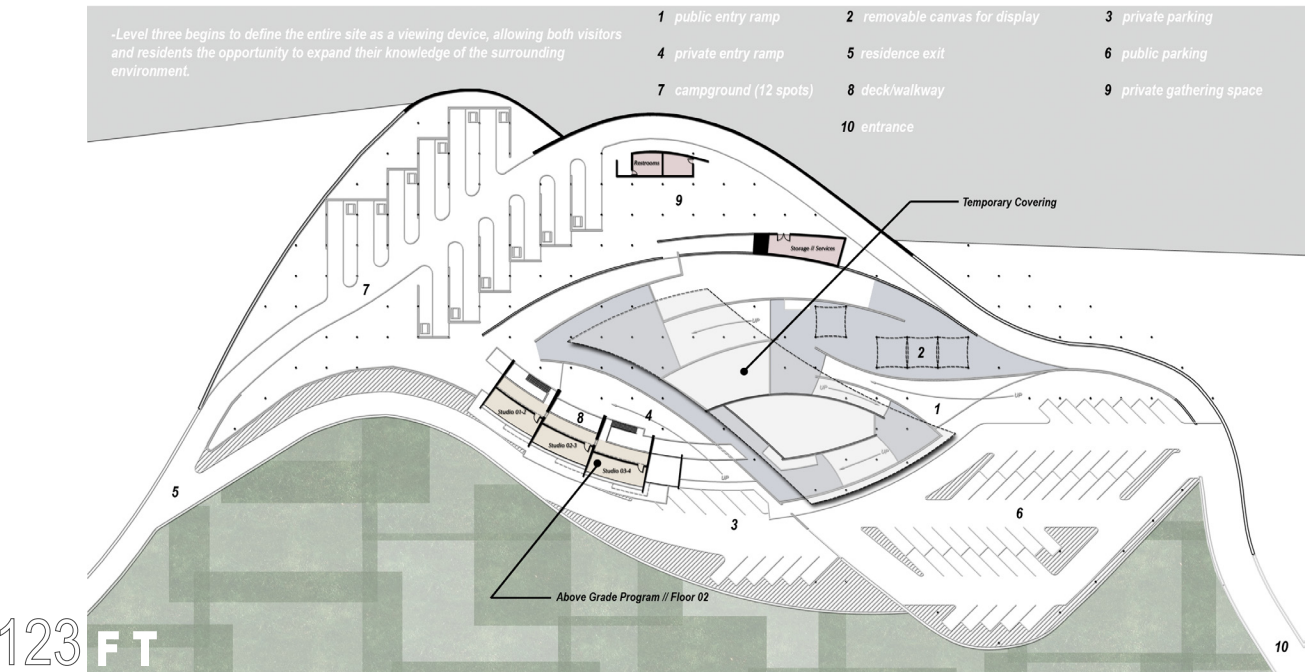
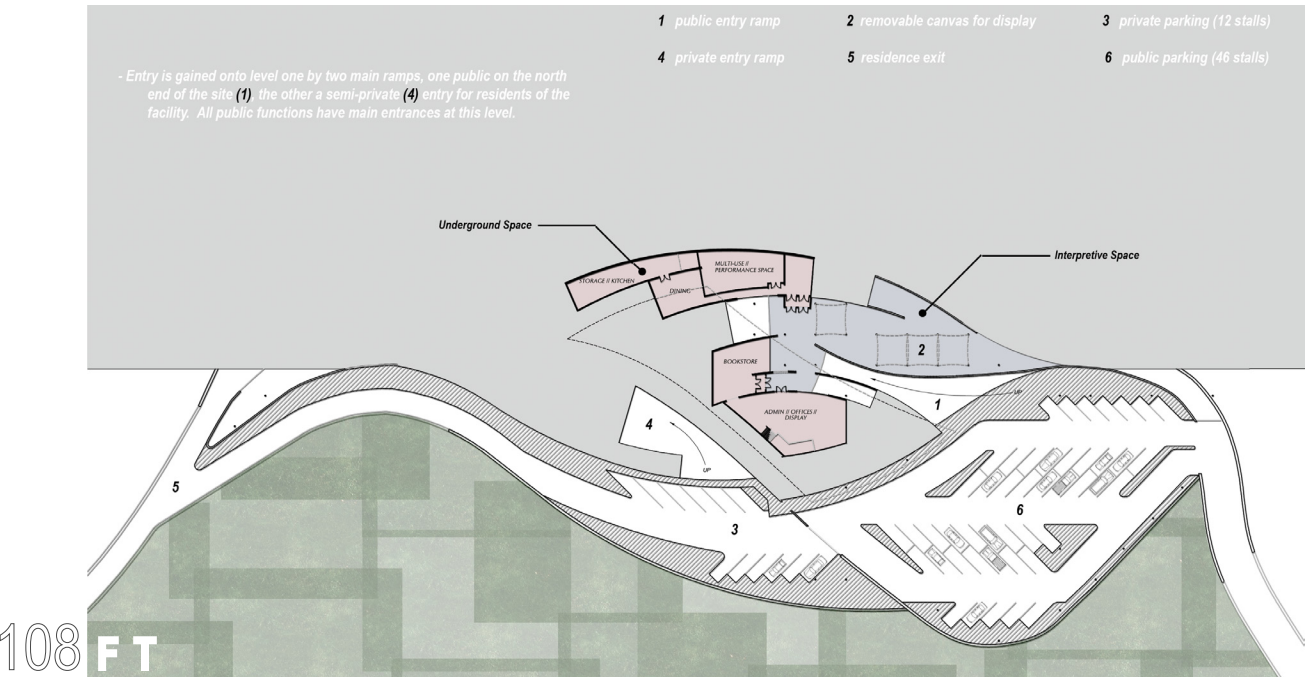
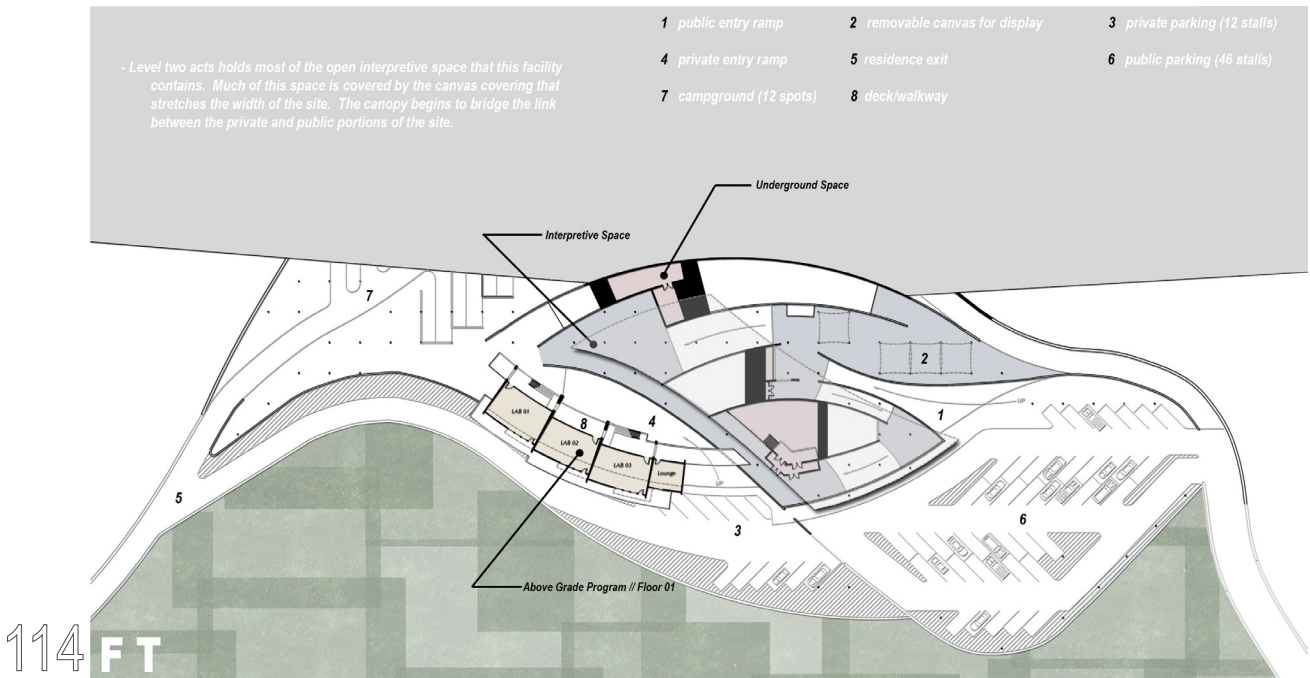
// BLIND REVIEW PRESENTATION WORK / CONT.



SITE PLAN (NO SCALE) // At this point in the design process, the overall form of most of the structure was defined, although materials and interior spaces were not.

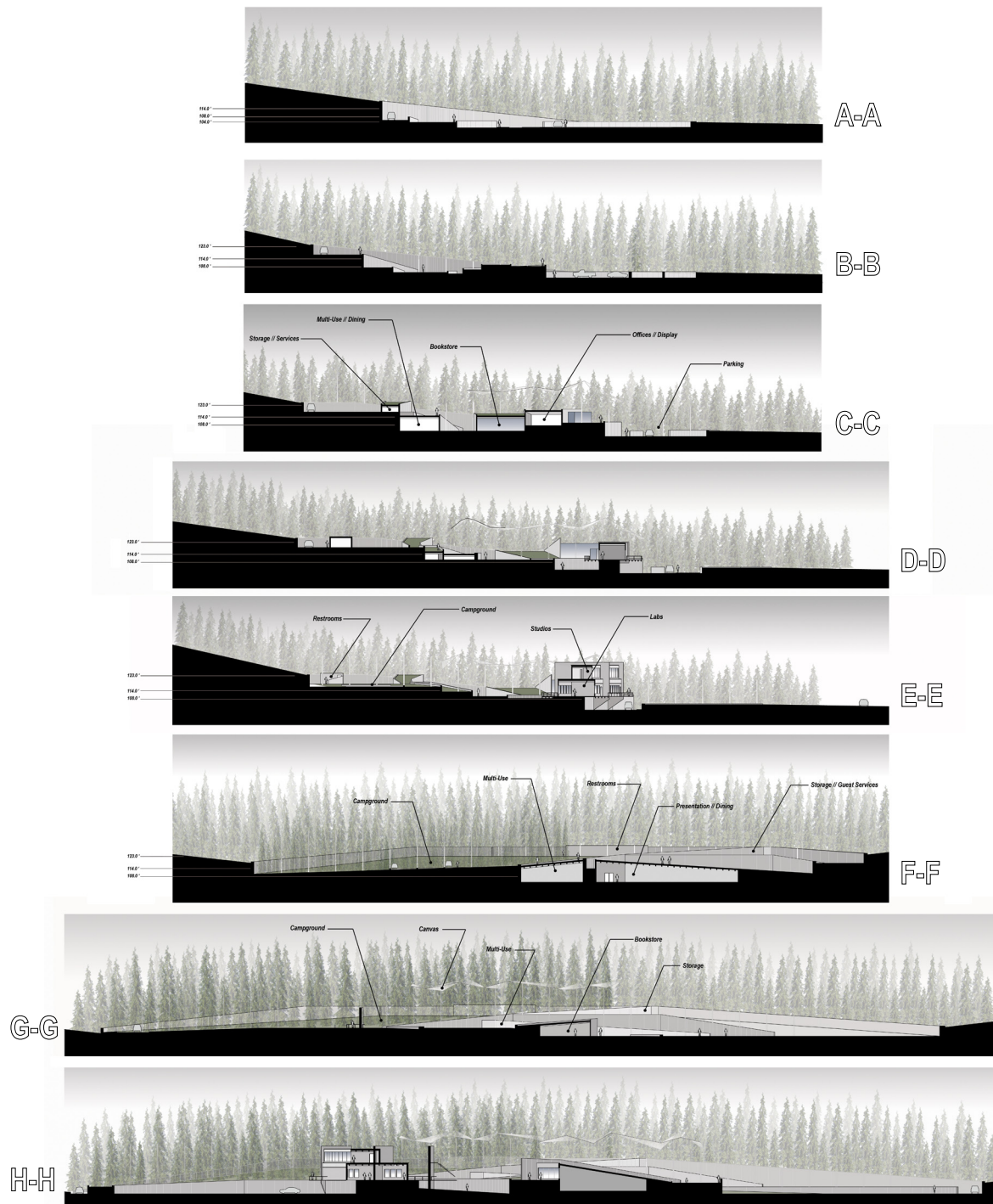
// BLIND REVIEW PRESENTATION WORK / CONT.

Plans are displayed at their corresponding positions labeled on the site sections (pg. 69). Plans are horizontal sections cut at the labeled heights. Each plan is coded according to programmatic space. The blue is interpretive space, tan is labs, and the red is built space.



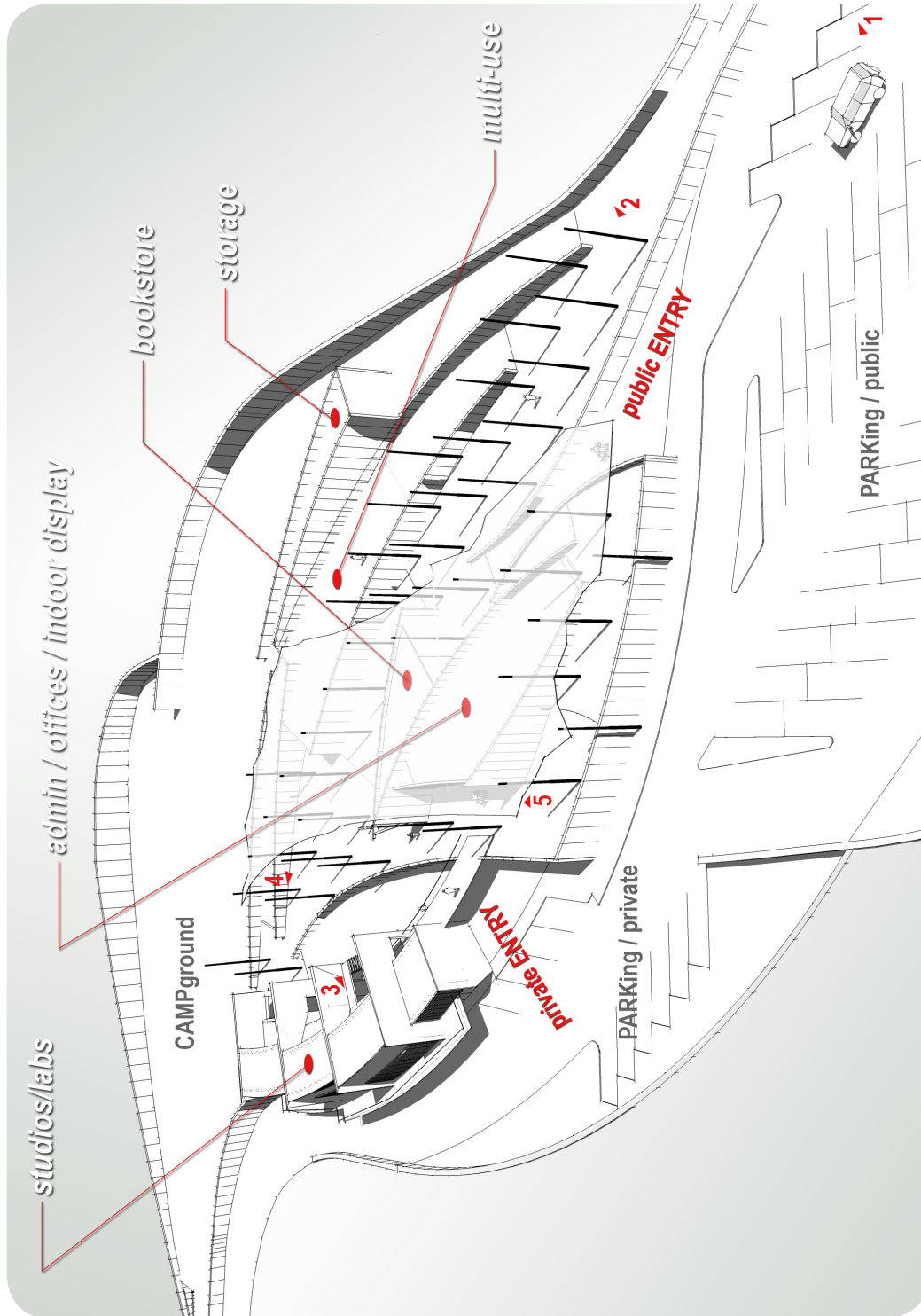
C o n c e p t u a l D e s i g n

// BLIND REVIEW PRESENTATION WORK / CONT.



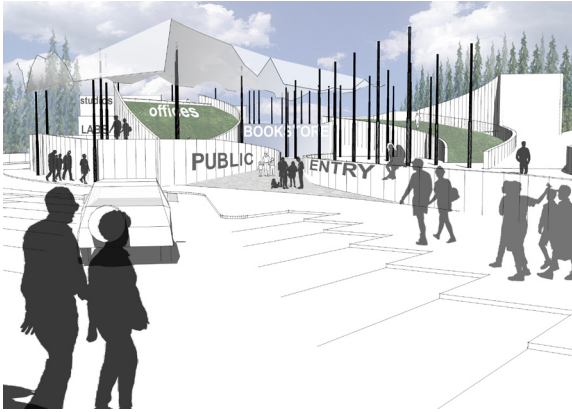
Sections correspond to **SITE PLAN** on page 67.

// BLIND REVIEW PRESENTATION WORK / CONT.



Images on the following page are keyed on the above plan. This Sketch-up model shows progress at the point of the blind critique.

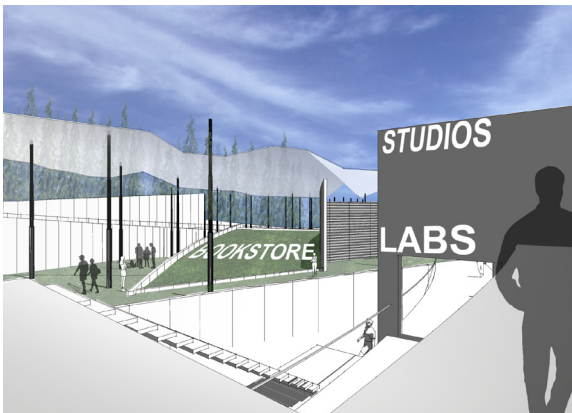
// BLIND REVIEW PRESENTATION WORK / CONT.



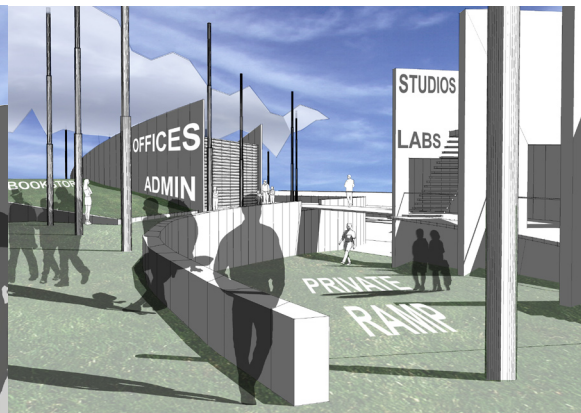
1 public entrance



bookstore **2**



3 art studios



interpretive space **4**



exterior administration **5**

TERMINAL PROJECT BRIEF // EXTENDED 12.13.04

/1ST SEMESTER REVIEW.DOC

“INTERPRETING A DIVIDE”

PROGRAMMING:

The main function of this facility is to act as an Interpretive Center providing information about the surrounding ecosystem and the Continental Divide. The center will also have the capability to house 12 visitors for several weeks at a time. Visiting ARTISTS and SCIENTISTS can stay at the facility as a part of an agreement with the National Park Service. They can use the facilities in turn for a piece of work to be donated at the end of their stay (artists) and must also provide informative sessions with the public regarding their studies or their artwork. They will also have to develop work to be displayed in portions of the interpretive center.

- Rocky Mountain National Park already has an Artists-in-Residence program, although it can only house 1 artist for a two week period. (look at pg.29 for more information)
- The McGraw Ranch, which allows visiting scientists a place to stay and work while working on research projects within the National Park, although they must travel upwards to an hour to reach the Continental Divide within the park. This facility would enable them to expand their facility in order to provide a better location for their studies.

THE FACILITY CONTAINS THESE OTHER FUNCTIONS:

MULTI-USE// LECTURE SPACE - used for meetings, gatherings, demonstrations by residents, etc

BOOKSTORE// INFO DESK - ran by the Park Service and their rangers, artwork and other misc. items would be sold here // and information regarding this individual center

KITCHEN & DINING AREAS - used for residents while during their stay // a medium sized kitchen, self service // and a designated dining area will also be present

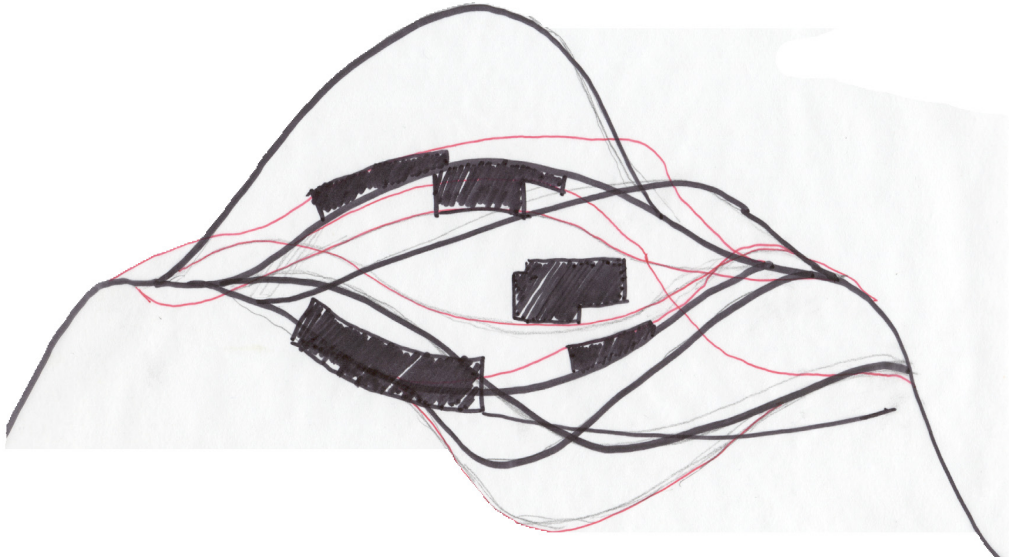
CAMPGROUND - used specifically by the visiting artists and scientists // the park service will provide each resident a Recreation Vehicle (RV) to use during their stay
-the RV (as a form of MIGRATION) will be used during the 5-6 months of the year that the site is open // when the site closes off to the public, the RV's will be taken down the mountain and possibly sent to other parks within the United States and used there until they are able to be used again in the spring. This facility could become the first of a series of networked programs throughout the country.
- 12 spots will be available w/ complete hookups to electricity and water; they also will have space for one personal vehicle

INTERPRETIVE SPACE - the majority of the interpretive space will be outdoors under the canopy. Most of which will be temporary displays of current work and/or work that has been done at the facility.

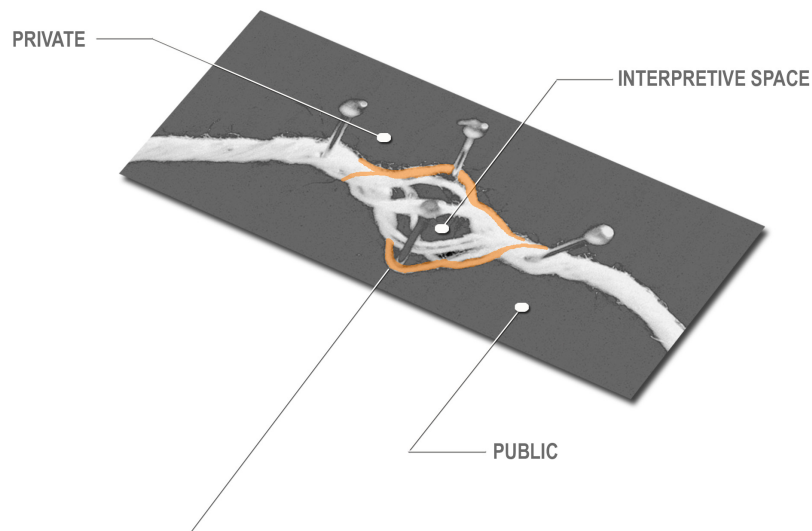
P r o c e s s E x p l a n a t i o n

THE FOLLOWING PAGES WILL GO THROUGH THE CONCEPTUAL PROCESS OF THE FALL SEMESTER. THE PROCESS WILL THEN LEAD TO THE FINAL PRESENTATION OF THE PROJECT AT THE END OF THE SPRING SEMESTER.

// FORM DEVELOPMENT // STRING THEORY

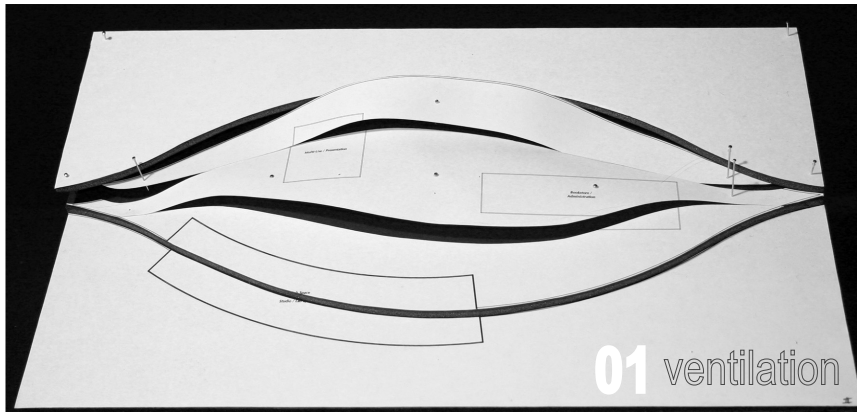


The formal process can be explained as rope that has been loosened at one spot in order to expose the strands of which it was created from. At the point of loosening (Interpretive Space), there are several strands that emerge that once created the one original edge. **Exposing what creates the single strand explains the creation of the line.** This relationship creates a zone of interaction between the original edges that exposes a space that becomes the Interpretive Center.

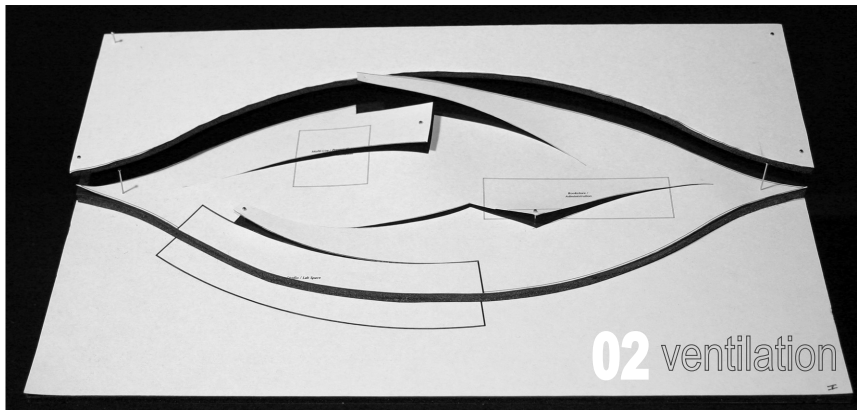


The orange represents the splitting of the strand/program. The strand was a single closed condition and now has two edges that are closed conditions (the orange) within different programs that occupy these edges.

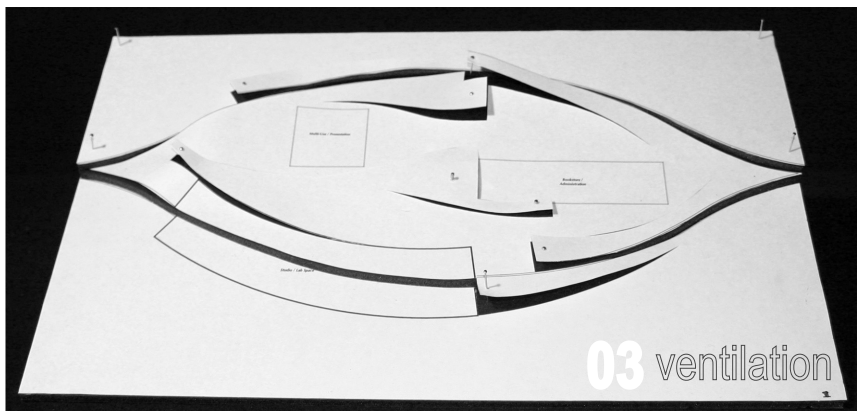
// FORM DEVELOPMENT // VENTILATED PLANE



Initial formal studies started by simple manipulations of the ground plane. Basic programmatic layouts were placed on the site and manipulations followed.



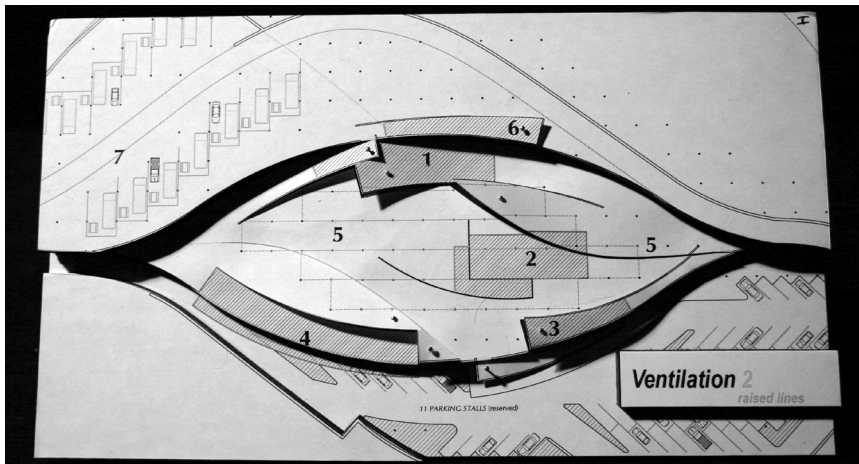
Ventilation **01** shows the first attempt at utilizing the ground. Two simple cuts were made, developing a 'terraced' form. As seen in **02** and **03**, these lines developed into raised areas that were cut from the ground. The idea became to develop programmatic space within these 'tears'. This allowed for the programmatic spaces to be protected by the earth and using its strength, rather than created its own.



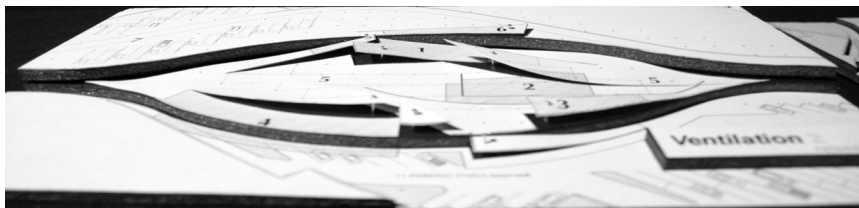
Eventually these 'tears' and ramps became utilized space, both under and above. Although programmatic spaces were not defined.

Some studies acknowledged the rough layout of program, **03**, by cutting around the actual designated areas of program, while others cut right through them. Eventually, the tears themselves became the layout of space, with little acknowledgment of the initial layout of program (similar to ventilation **02**).

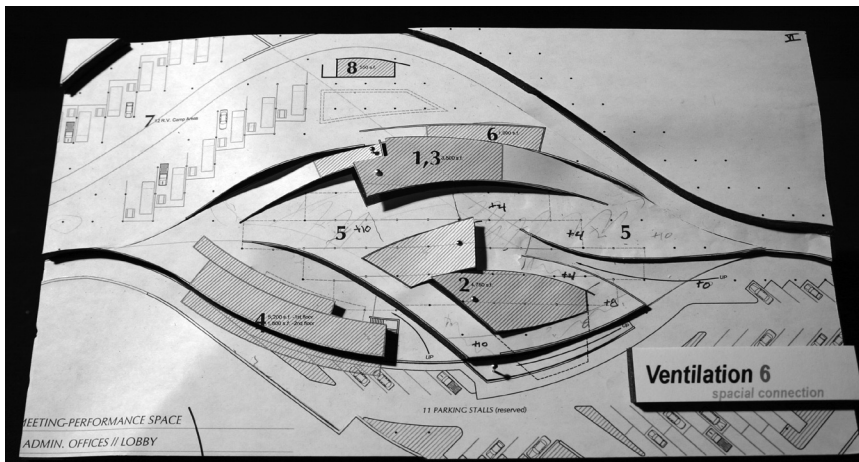
// FORM DEVELOPMENT // VENTILATED PLANE // CONT.



After determining the usefulness of the space under each raised portion of ground, a second set of ventilations were made. These began to focus towards incorporating the entire site, not just the program areas.



A series of ventilations were done, similar to ventilation **02** to the left. These began to look at ramps and spaces beyond that of the current edges of the site. These new raised areas could be used as storage on the inside and ramps for public use on the top surfaces.



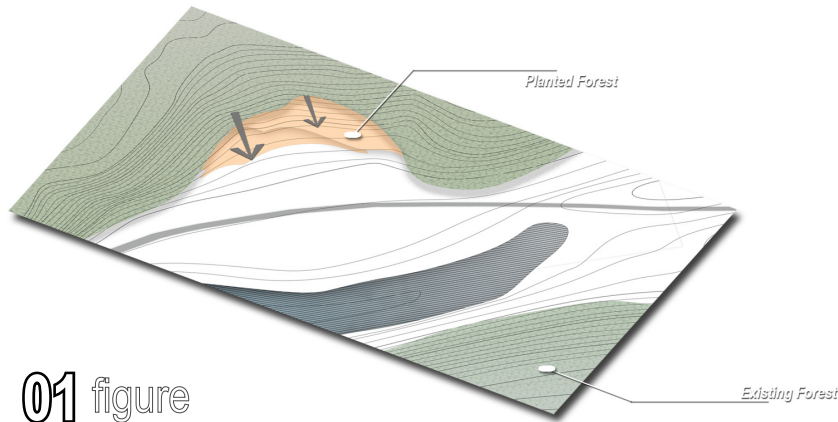
After several studies like 02, it was noticed that there was two clear lines being made that everything was contained in. These two lines would have resulted in large (20-25 foot) retaining walls.



Several other studies began looking at diminishing these lines, and creating a continuously manipulated ground plane, **06**.

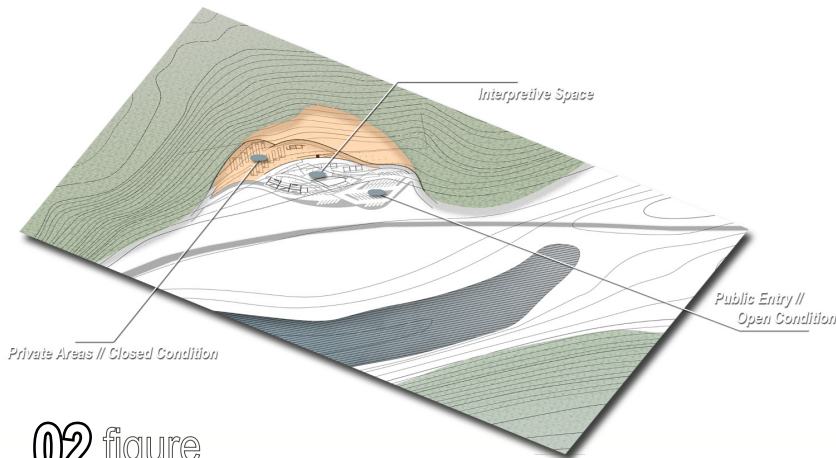
// FORM DEVELOPMENT // EXPRESSING A THRESHOLD_TREELINE

THRESHOLD



01 figure

The existing treeline (shown in green) was extended further towards the valley, as shown in **figure 01**. The treeline was extended for a multiple reasons; (1) would allow for the structure to not damage any existing trees, (2) it would bring the structure closer to the valley allowing users to see down the valley with little obstructions, and (3) would bring the center down off of a very steep area of the site.

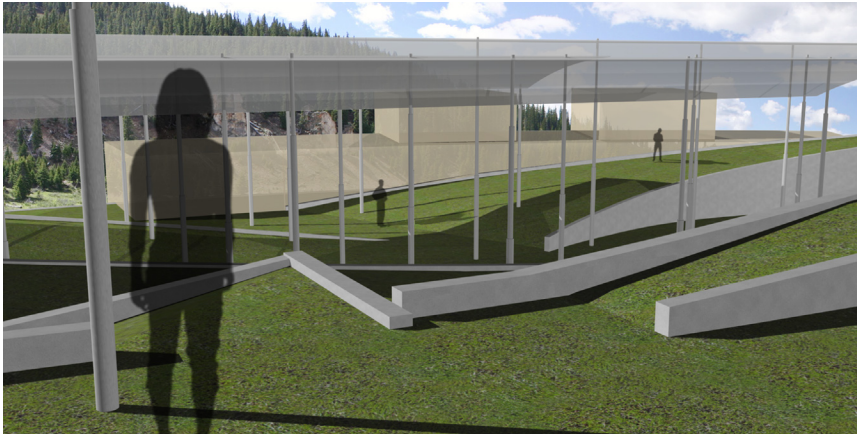


02 figure

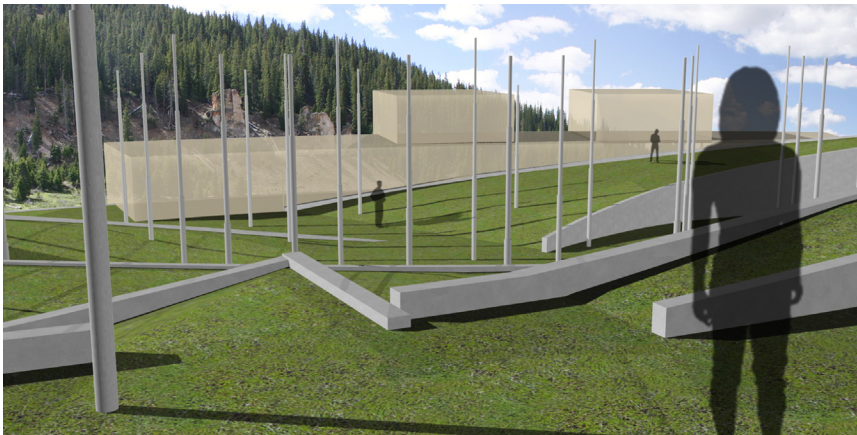
The new edge (created from the new treeline) would become the 'string.' As shown in **figure 02**, the new edge becomes one, of the many, strands created from the idea of the 'string.' The treeline becomes the most prominent edge within the site. It becomes the separation between public and private uses.

// FORM DEVELOPMENT // CANOPY STUDIES

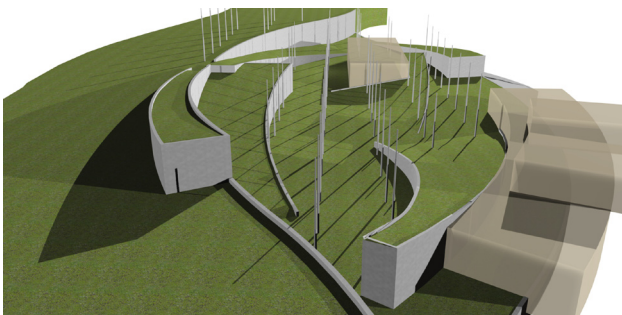
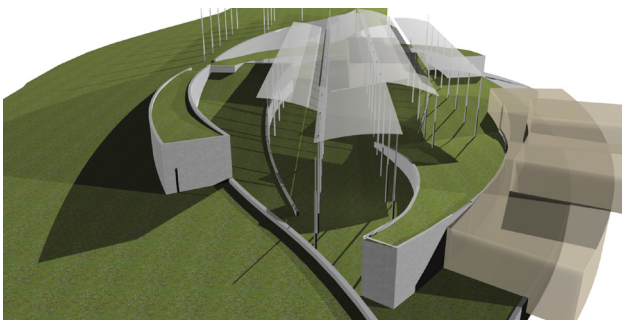
MIGRATION



As a part of developing a structure that was adaptable to its surroundings, a canopy was envisioned to cover the interpretive spaces that existed outdoors. The facility, as a form of **migration**, would have the ability to adapt itself to the surrounding environment just as the local flora and fauna.



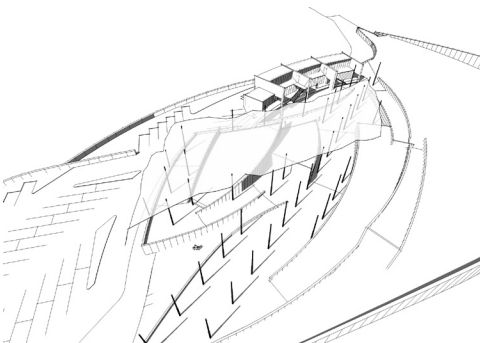
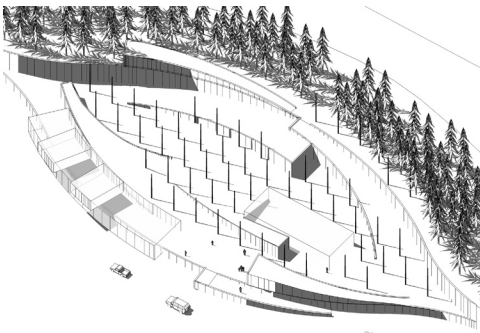
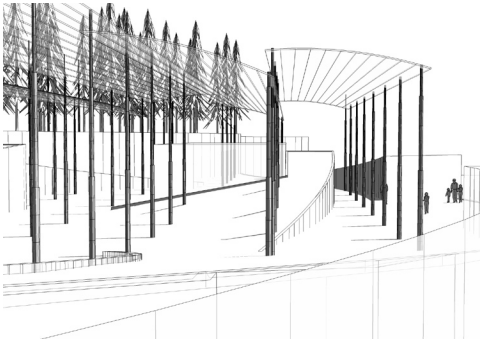
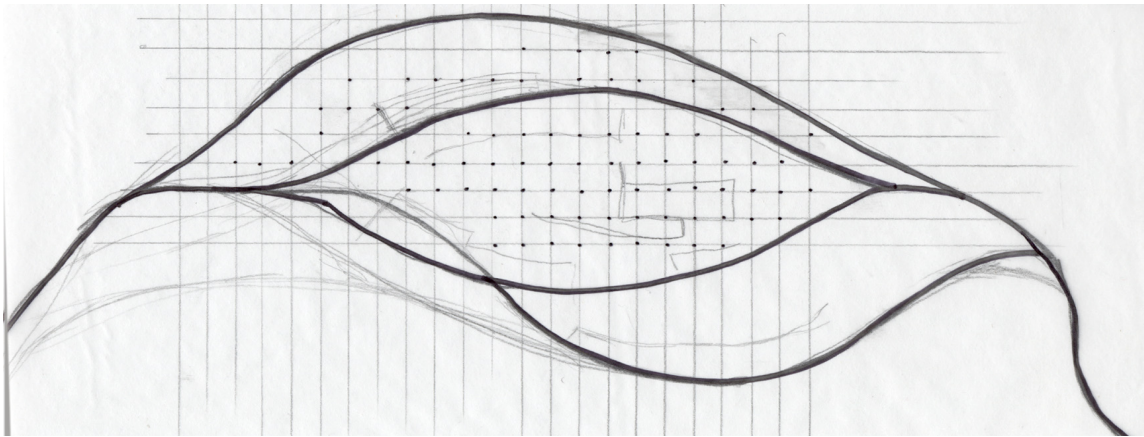
The canopy would be taken down when the facility would close for the winter. Its use during the open season, is to cover and protect the interpretive spaces from rain and excessive sun light



Early development of the canopy shows a rigid structure that would lay over the grid of columns that run throughout the site. Eventually, the canopy became a separate part of the design, creating its own pattern laid over the site. The grid was also diminished in later development.

// FORM DEVELOPMENT // COLUMN GRID

GRID



A continuous grid was placed over the site for several reasons, (1) to re-create a space that is similar to that of a forest, (2) structure for canopy, (3) an organizing feature that juxtaposes the irregularities within nature enough that it poses as something different but still something of the same, and 4) creates a basic module for display space to be created within each of its 20 foot divisions.

The grid was intended to blend the natural surroundings with built form. Evident in the renderings to the left, the grid became extremely dominant over the entire site. The grid eventually was made at a smaller scale and was limited only to display spaces. The grid developed into a much smaller scale, creating areas for temporary display in the final design.

// SEMESTER END REVIEW NOTES

JURY: WAYNE DRUMMOND, DEAN
NATHAN HOWE
PATRICIA MORGADO

EVIDENCE OF DESIGN ORGANIZATION AND DEVELOPMENT OF CONCEPTUAL IDEAS TO A SCHEMATIC LEVEL

Is there logic of form making other than an apparent random act of curved forms. There is difficulty understanding the tree and column organization and when the break from one another to the center occurs. Are they on the same grid? Also, is the grid necessary? Structurally, the grid may be a determinant to the form making. Is the grid coming from the site or some other place?

The campground and parking has not dealt with the nature of the site. They are creating barriers between the center and the nature. Should the parking fold into the landscape? The campground for RV's currently holds a place of visual dominance. Is this good?

Do all the researchers' have RV's? Why hasn't been an attempt to design a dwelling units tied to the landscape?

The designer also has to prove the form language and the program of the center is resolved.

LEGIBILITY OF THE PROJECT RE-PRESENTATION

What is your parti with circulation and major program organization?

The axon is the clearest drawing you have. The other drawings have miscues and so many layers they have lost their clarity.

POSITIVE POINTS REGARDING DIRECTION AND OPPORTUNITIES FOR PROJECT DEVELOPMENT

This is a complex form language with many forms overlapping and yet there is not a clarity shown in the presentation to prove they are correct. Overall it is recommended the designer needs to simplify their design ideas and presentation.

It is quite clear the designer has done a tremendous amount of work, simplify and clarify.

FINAL DESIGN & PROCESS

THE FOLLOWING CHAPTER STARTS WITH WORK THAT WAS PRESENTED IN THE FINAL CRITIQUE. THEN THE CHAPTER WILL GO THROUGH THE PROCESS THAT DROVE THE FINAL DESIGN IN THE SECOND SEMESTER.

-FINAL DESIGN PRESENTATION

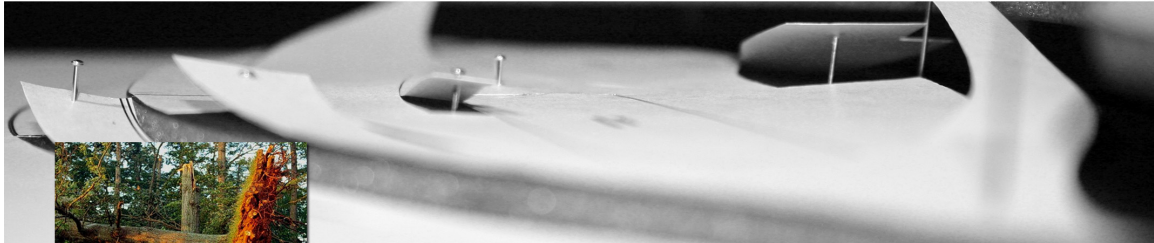
-PROCESS AND EXPLANATION // CLOSING

-ADDITIONAL PROCESS

THIS CHAPTER WILL BEGIN BY THE PRESENTATION OF ALL WORK DEVELOPED FOR THE FINAL CRITIQUE AT THE END OF THE SPRING SEMESTER. PROCESS WORK DONE DURING THE SPRING SEMESTER THAT LED TO THE PRESENTATION WILL BE REVIEWED LATER IN THIS CHAPTER.

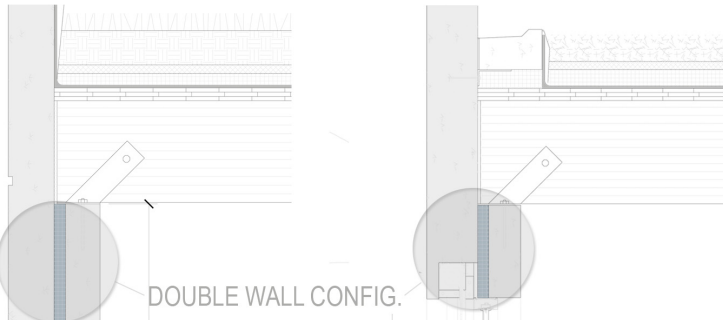
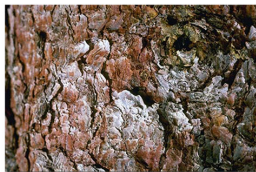
The second semester was a focus on designing a facility that learned from the **survival strategies** of the permanent residents of the site (i.e. local flora and fauna). The following became key issues in detailing the facility:

UTILIZING THE GROUND PLANE



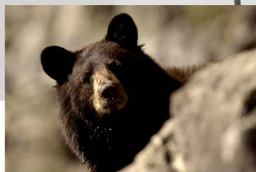
As a means of protection, the ground is extremely important for the survival of many plant and animal species. In the case of many animals, the ground is a place for retreat during the night as well as the winter. The ground gives them warmth as well as protection from predators.

SKIN

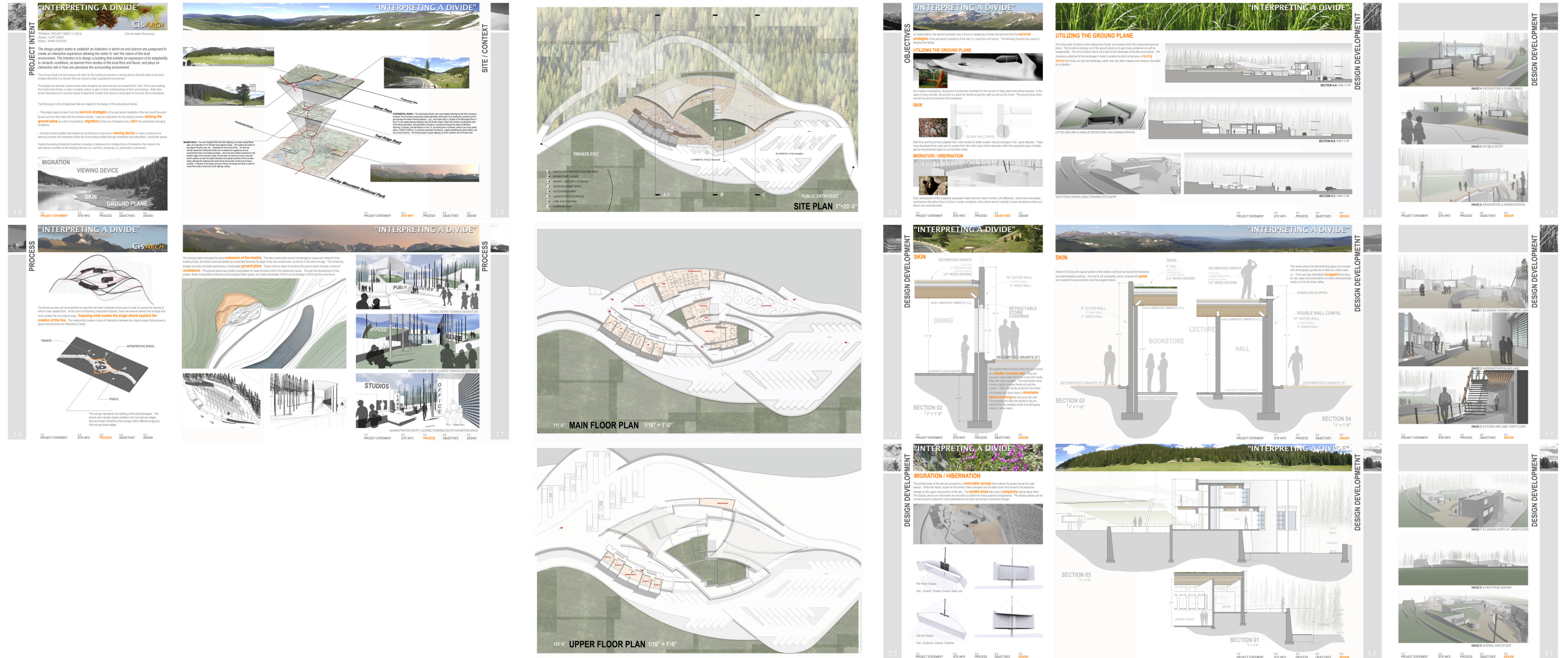


Both flora and fauna have adapted their outer surface to better sustain nature's changes in the upper altitudes. Trees have developed thick outer bark to protect from fire while many of the mammals within the ecosystem grow a thicker pelt as temperatures begin to cool towards winter.

MIGRATION / HIBERNATION



Each animal/plant of the subalpine ecosystem deals with the onset of winter a bit differently. Some have developed mechanisms that allow them to thrive in winter conditions, while others tend to migrate to lower elevations where conditions are more favorable.



Final Presentation boards as presented for the Final Critique.

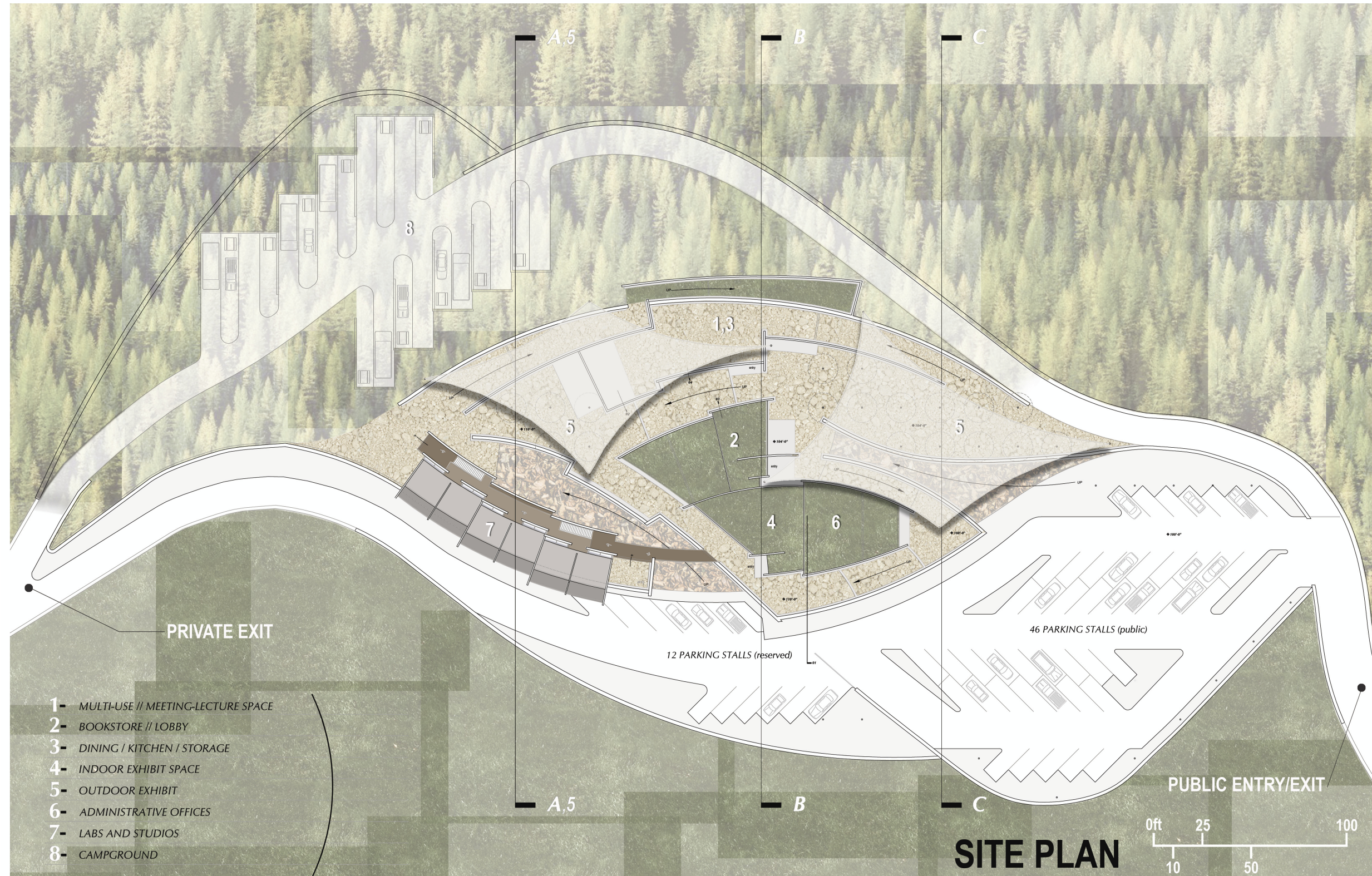
SITE PLAN

As visitors come into the Poudre Valley, there will be no obstructed view down the range since the facility is tucked back into one of the many coves created by the meandering treeline.

Visitors must exit highway 34 onto the entry road that takes them towards the facility. The landscape has been built up around the parking lot as to block it from view of the road. From the road, one would see only forms protruding through the earth (i.e. Bookstore, Administrative Office).

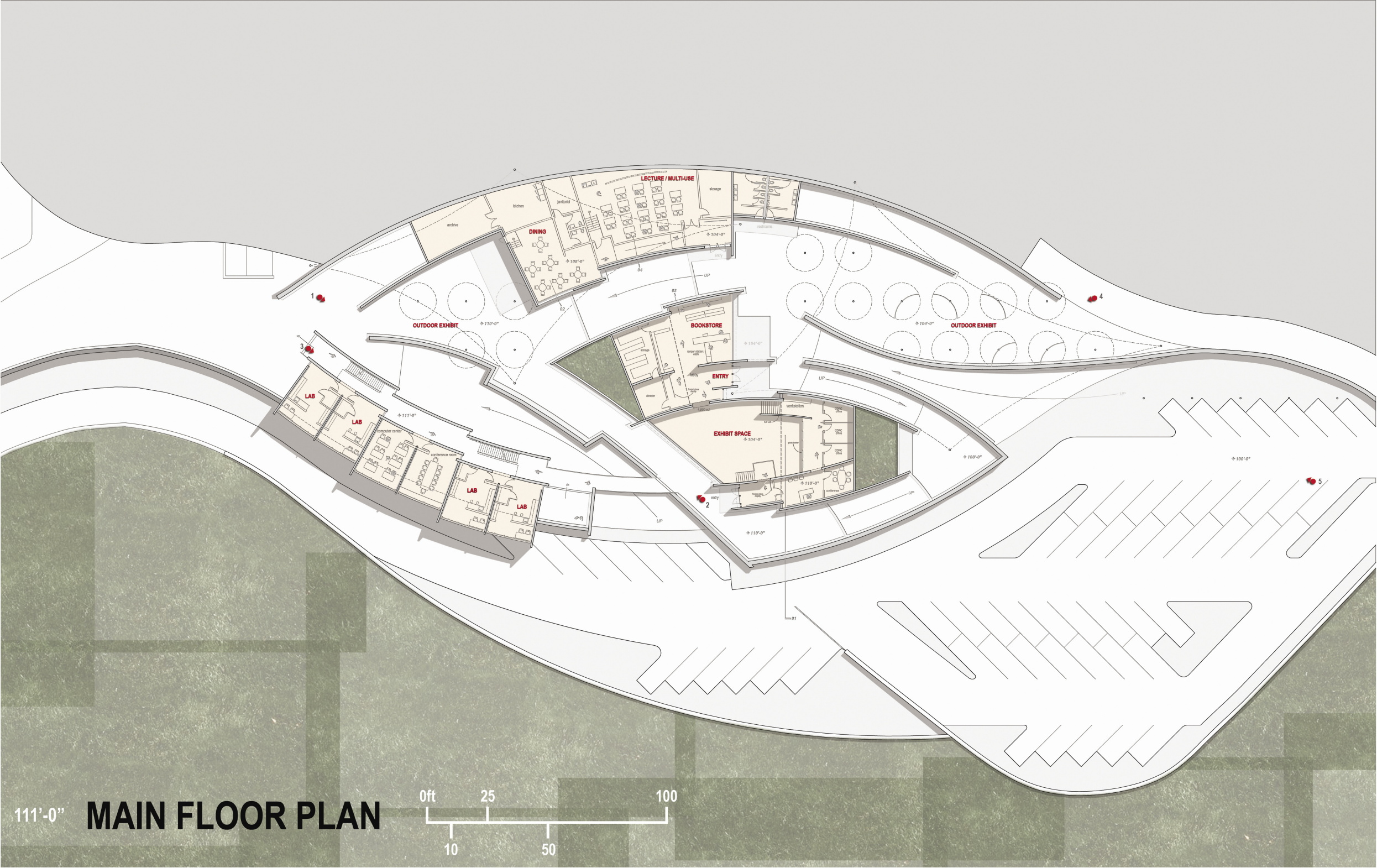
Once parked, visitors would enter upon the entrance ramp that directs one towards the bookstore.

The intention is to create a facility that has almost the same feeling of the natural surroundings of the mountainous region that it lies within.



MAIN FLOOR PLAN

// FINAL PRESENTATION // CONT.



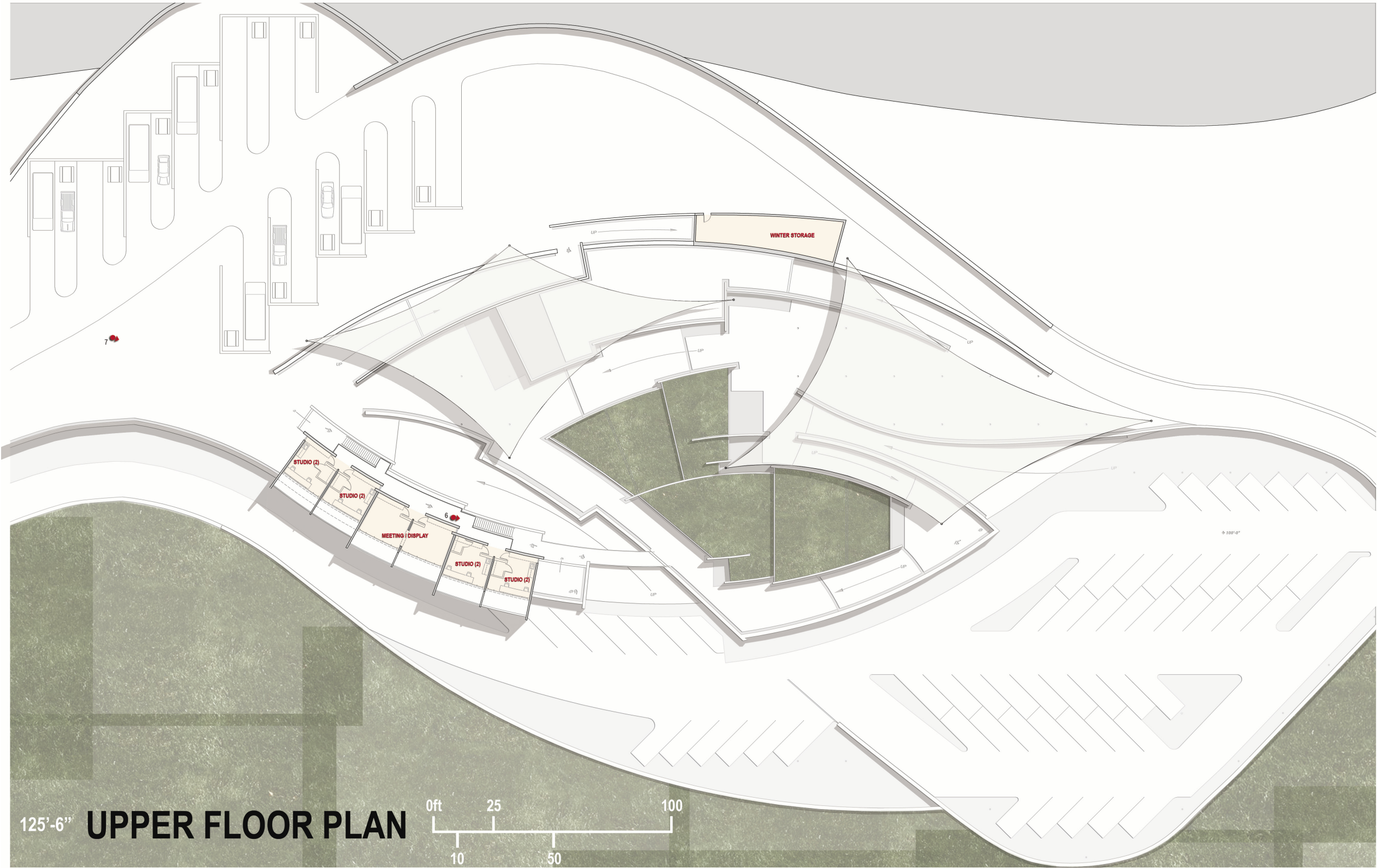
Upon entering the site, visitors will begin seeing the outdoor exhibit areas to their right (exhibit locations shown with dashed circles). Not all the exhibit spaces have to be used at one time. The exhibit displays are removable and can adjust to lock in any position.

Indoor spaces are shown in the light orange. The hatched grey lines represent either building walls or site retaining walls.

All walkable surface is made up of decomposed granite. The only other surface material used, is the grass used on the roofs over the Bookstore and the Administration building. The grass surface is not intended to be walked on, as is none of the grass within the National Park. The grass in the upper elevations is extremely sensitive since it is such a fragile ecosystem.

MAIN FLOOR PLAN

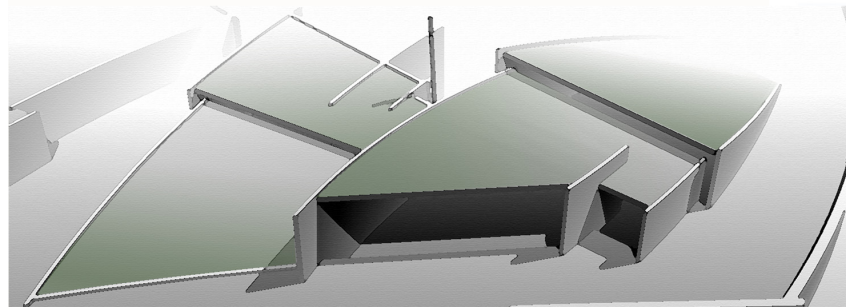
// FINAL PRESENTATION // CONT.



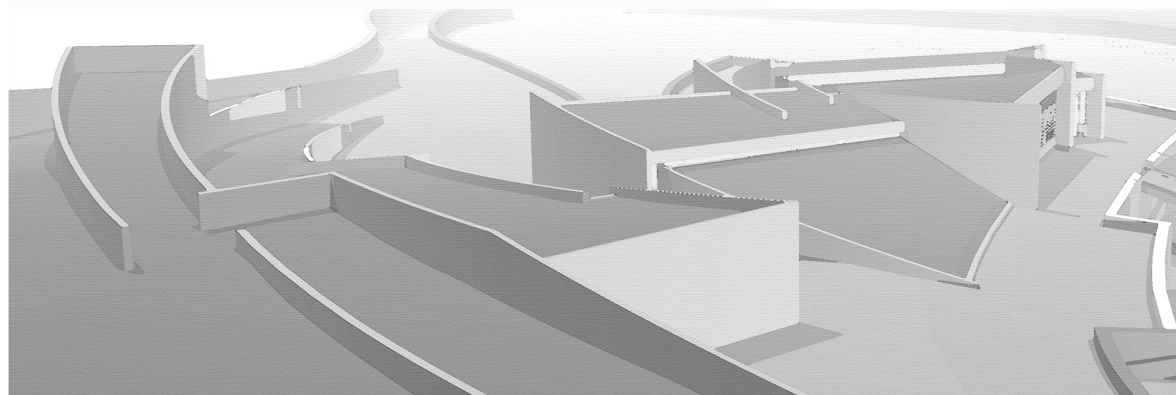
SITE SECTIONS 01

UTILIZING THE GROUND PLANE

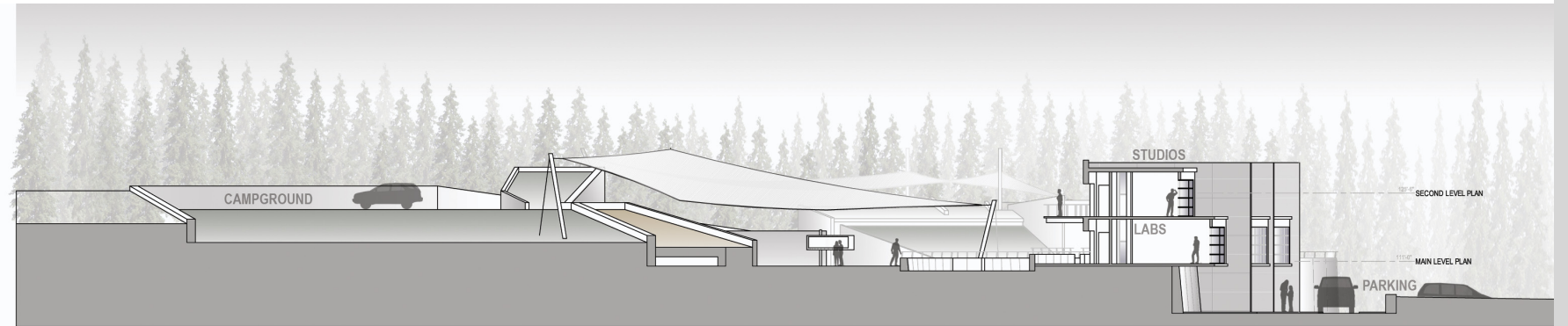
All of the public functions of the Interpretive Center are housed within the manipulated ground plane. The functions emerge out of the ground plane as to gain more protection as well as sustainability. The only function that is not a part of the landscape is the labs and studios. The massing is attached to the landscape in order to enable the form to become a viewing device that looks out into the landscape, rather than the other masses that retreat to the earth for protection.



LIFTED GROUND PLANES OF BOOKSTORE AND ADMINISTRATION



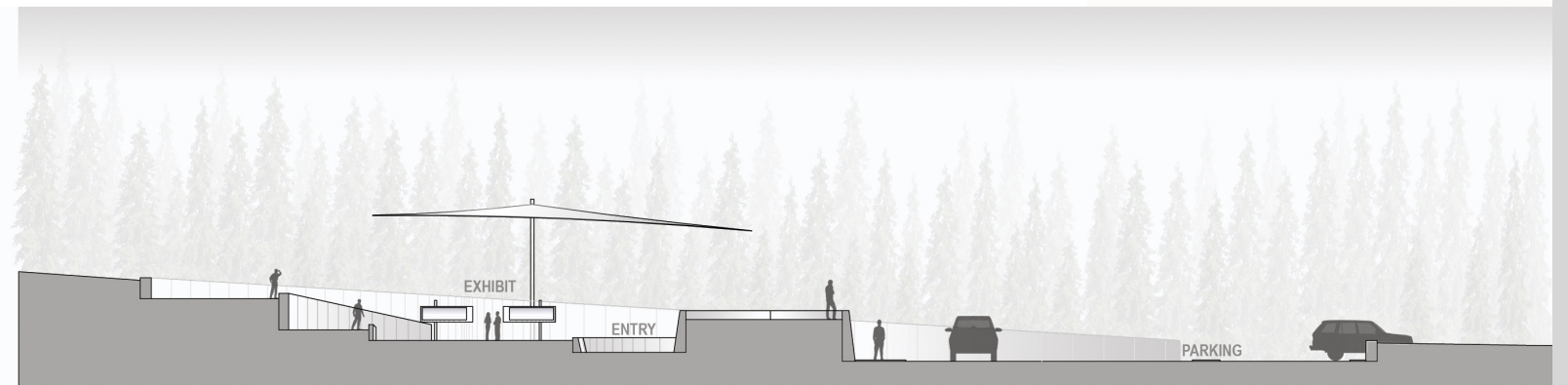
VIEW FROM CAMPING AREA TOWARDS SITE ENTRY



SECTION A-A

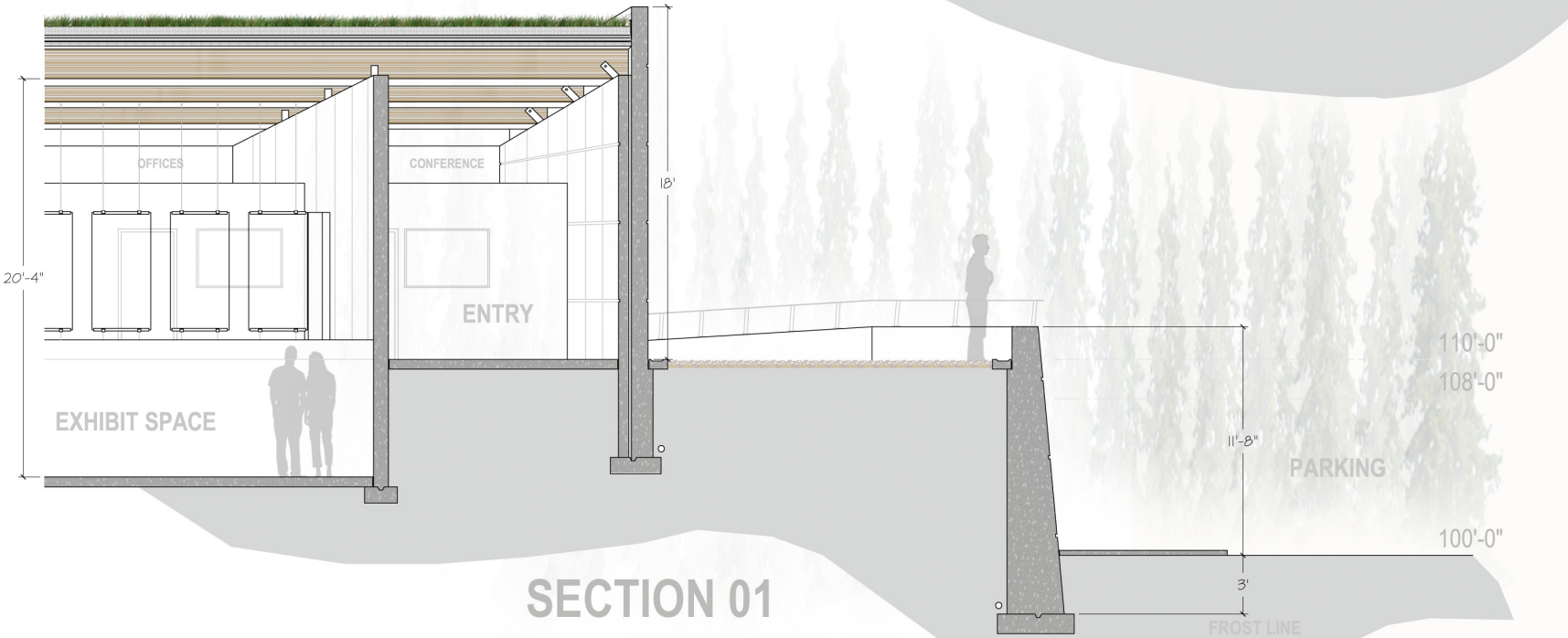
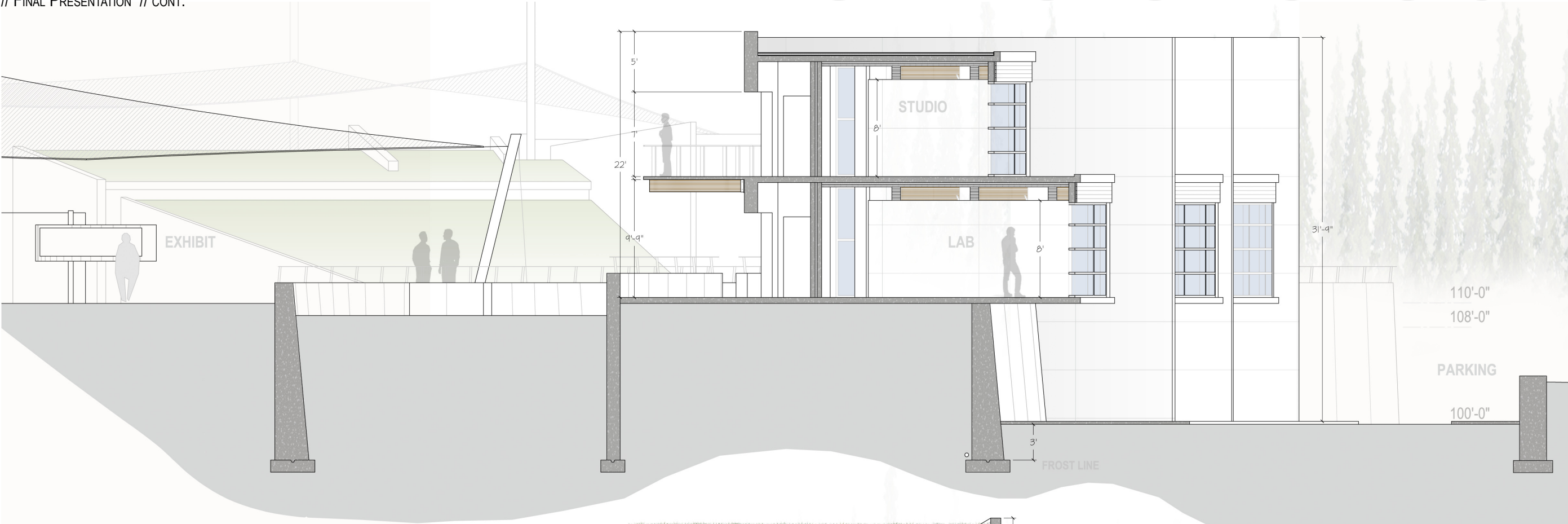


SECTION B-B

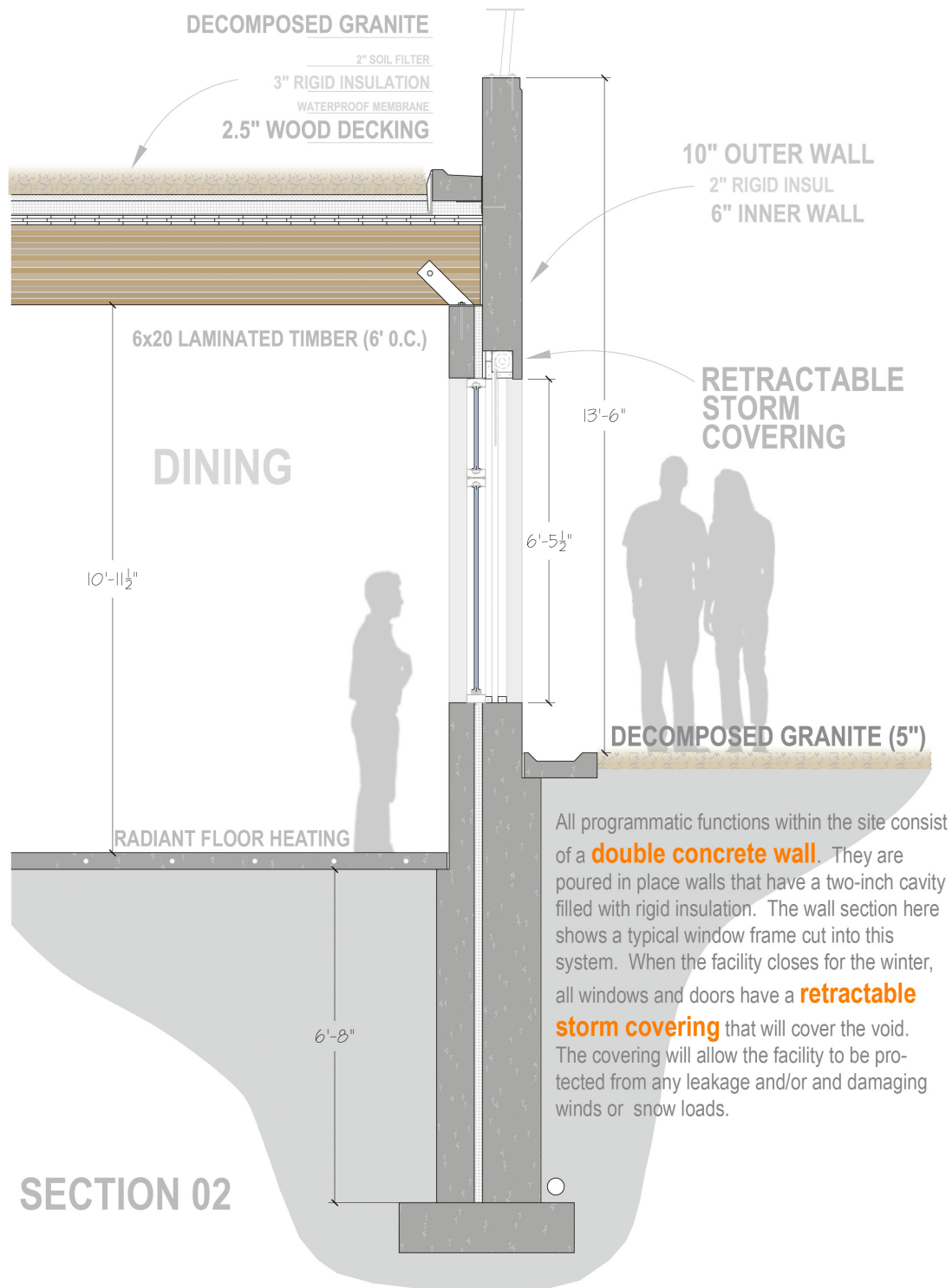


SECTION C-C

// FINAL PRESENTATION // CONT.



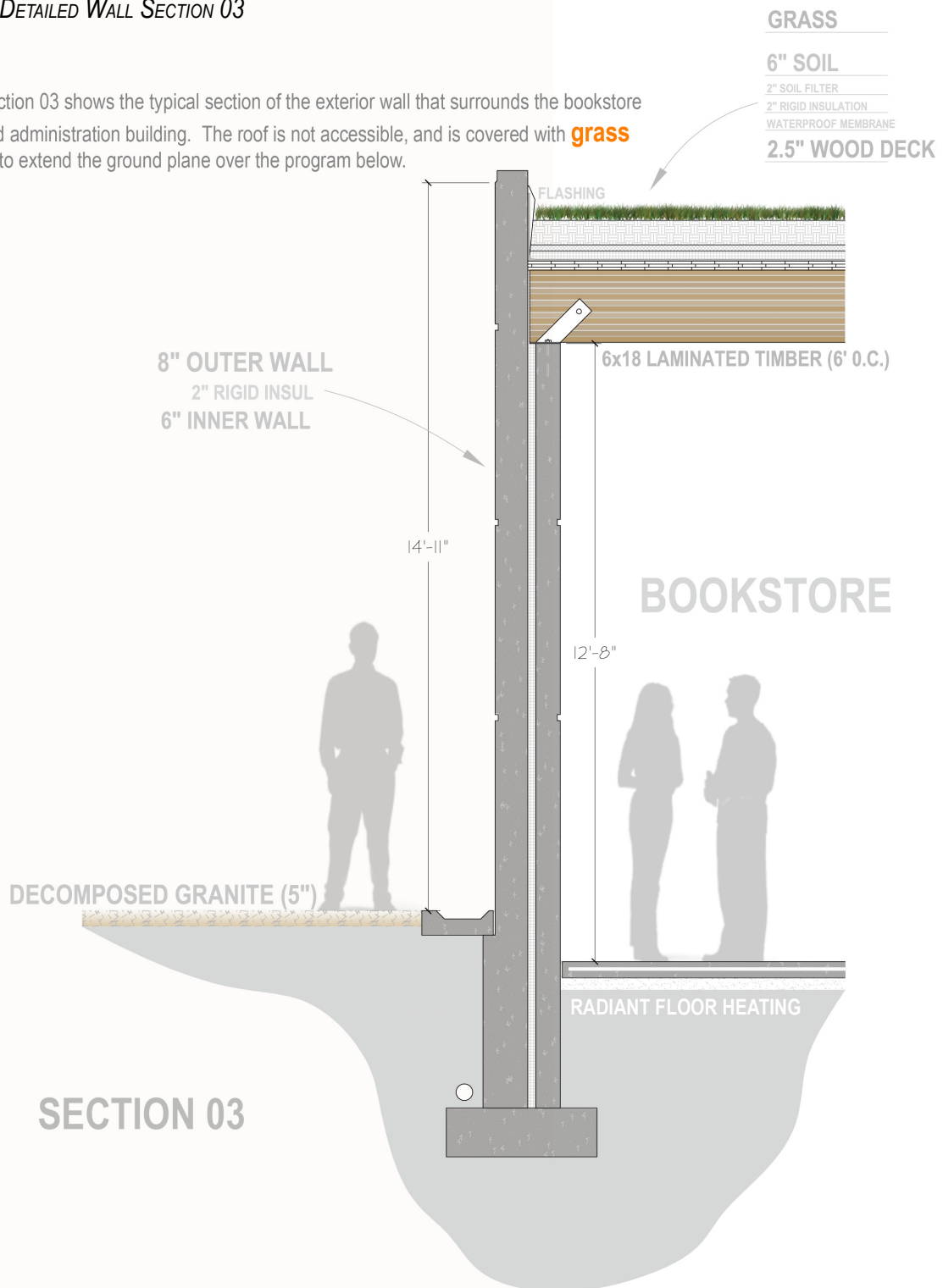
// DETAILED WALL SECTION 02



**Sections labeled on floor plans.

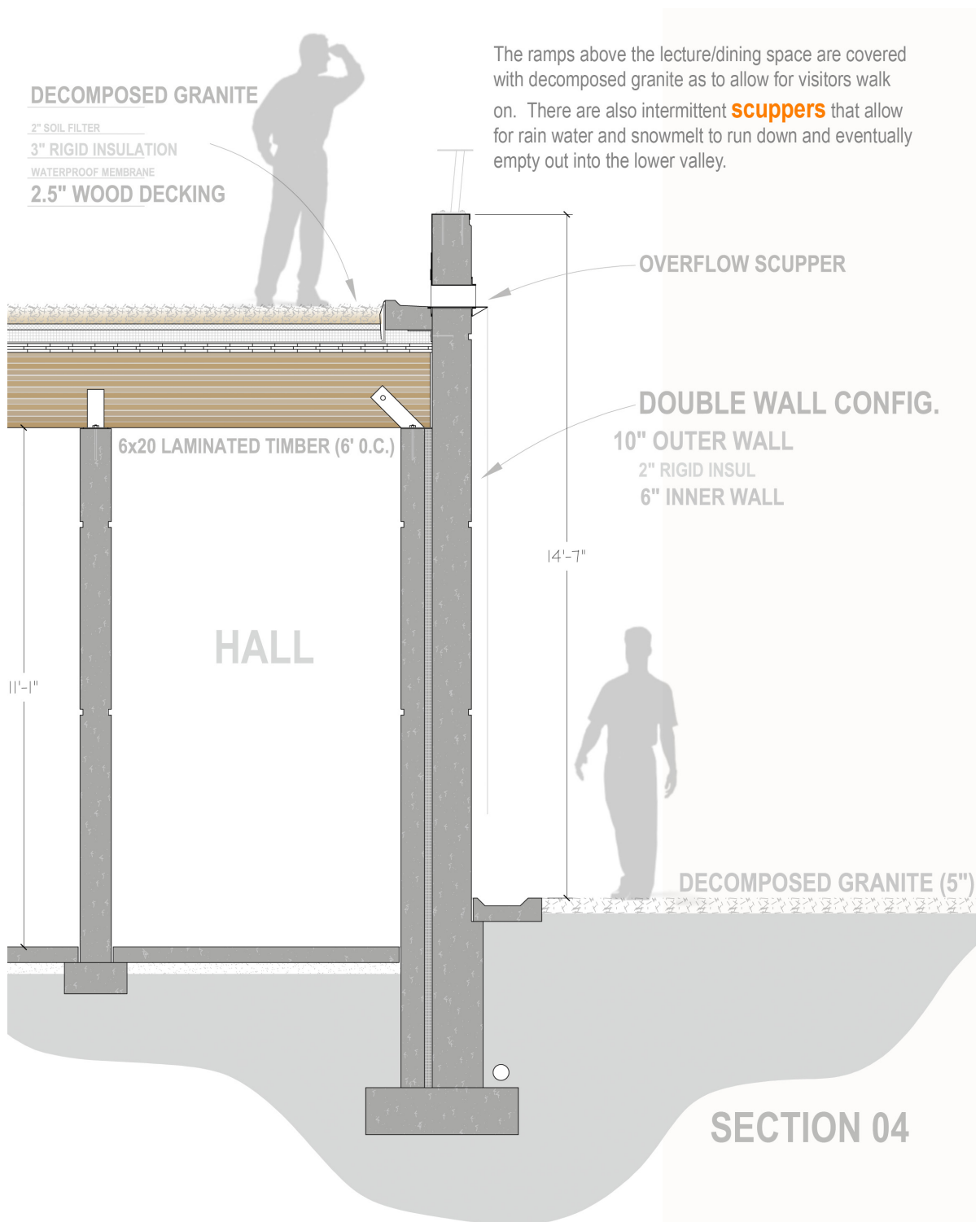
// DETAILED WALL SECTION 03

Section 03 shows the typical section of the exterior wall that surrounds the bookstore and administration building. The roof is not accessible, and is covered with **grass** as to extend the ground plane over the program below.



****Sections labeled on floor plans.**

// DETAILED WALL SECTION 03

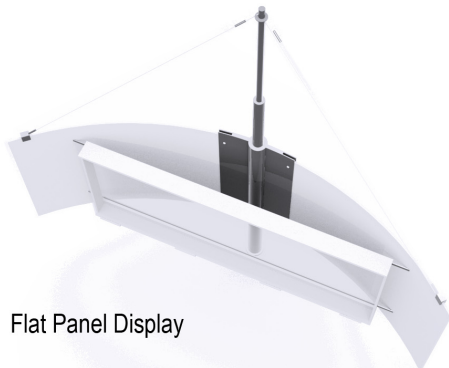
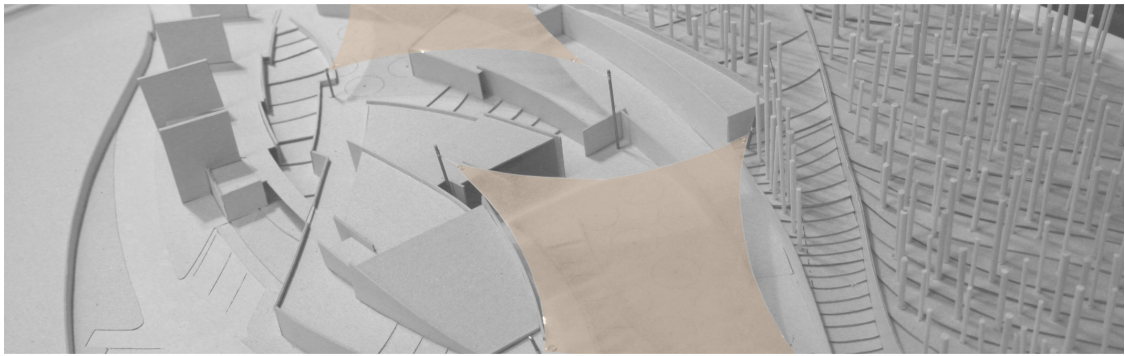


**Sections labeled on floor plans.

// DISPLAY UNITS

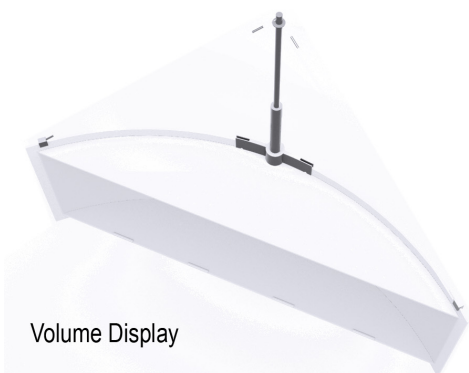
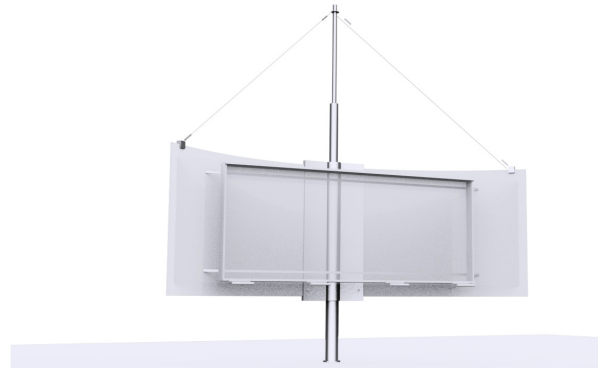
MIGRATION / HIBERNATION

The exhibit areas of the site are covered by a **removable canopy** that protects the areas during the open season. When the facility closes for the winter, these canopies can be taken down and stored in the seasonal storage on the upper most portion of the site. The **exhibit areas** also have a **temporary** nature about them. The display pieces are removable and are able to conform to many spacial arrangements. The display pieces can be moved around to adjust for most presentations and also are stored in seasonal storage.



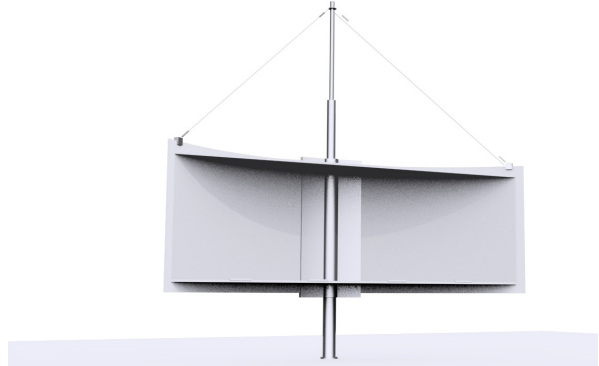
Flat Panel Display

Use: Artwork, Posters, Events, Maps, etc.



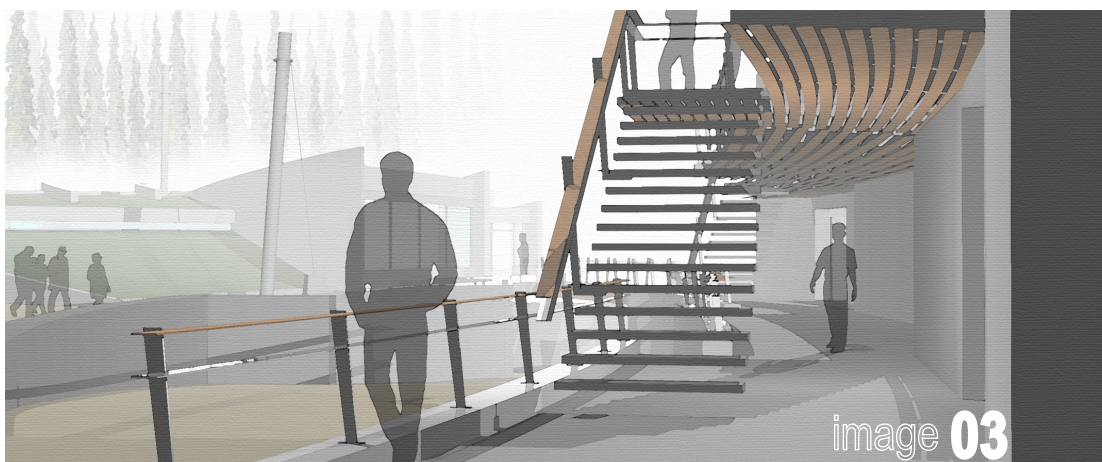
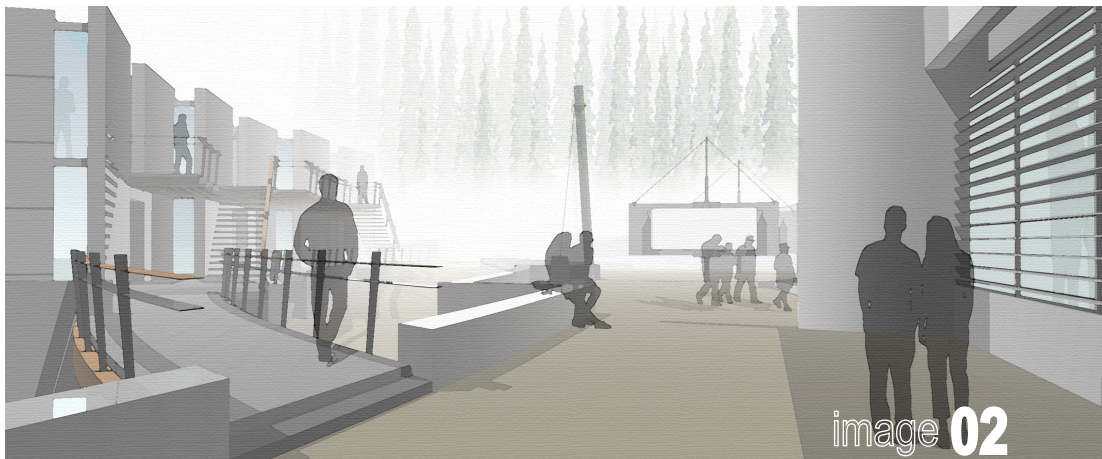
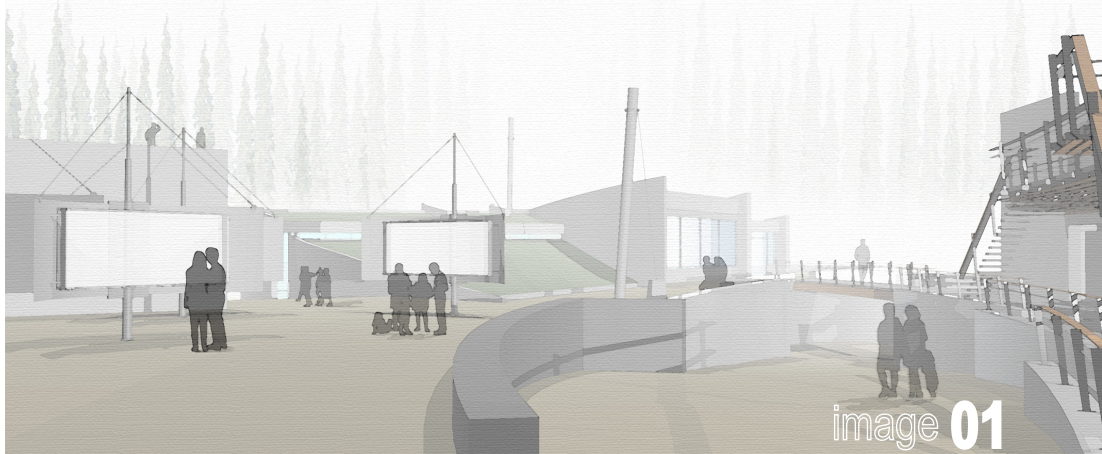
Volume Display

Use: Sculpture, Artwork, Diorama



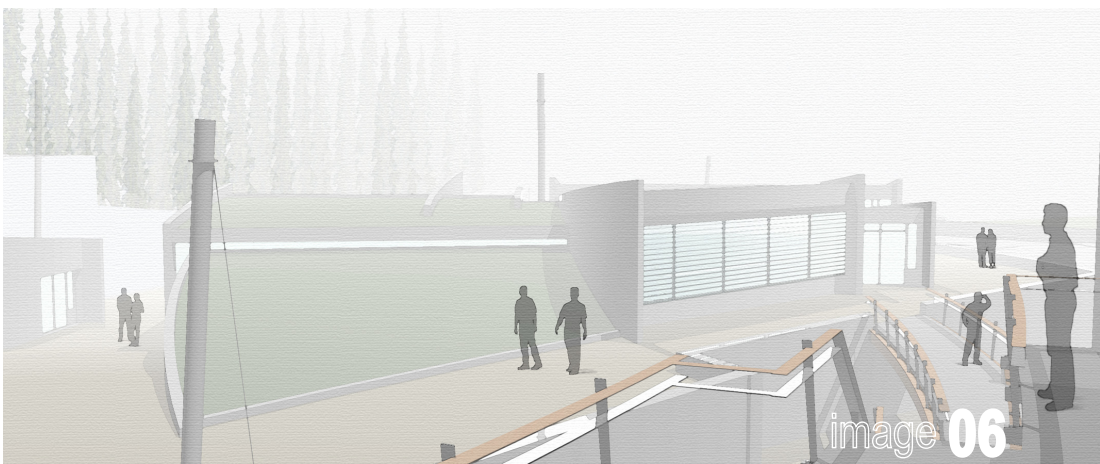
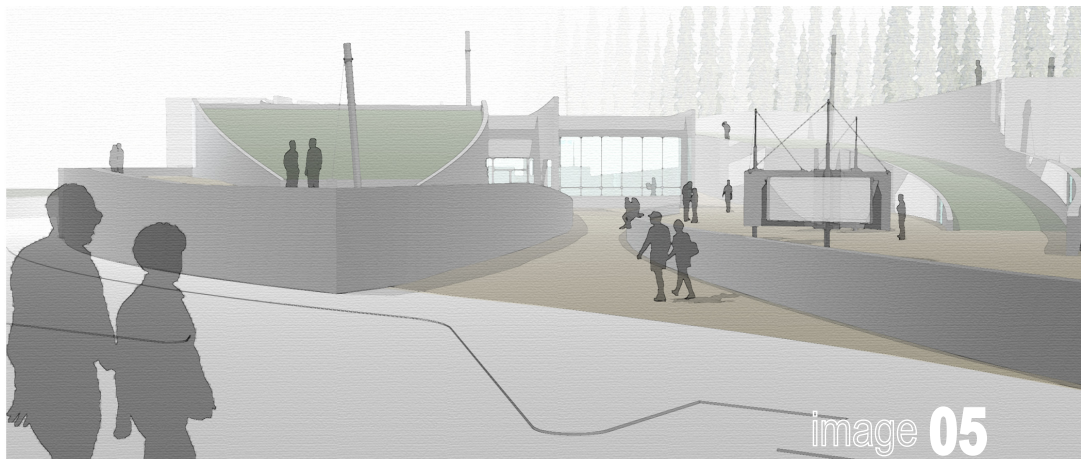
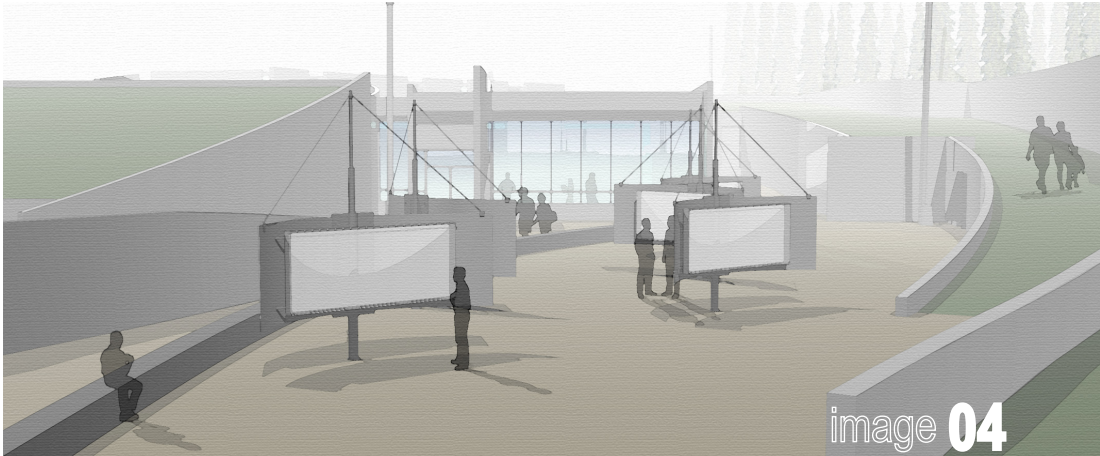
// SITE PERSPECTIVES

All images can be referenced back to the floor plans (pg. 84-85).



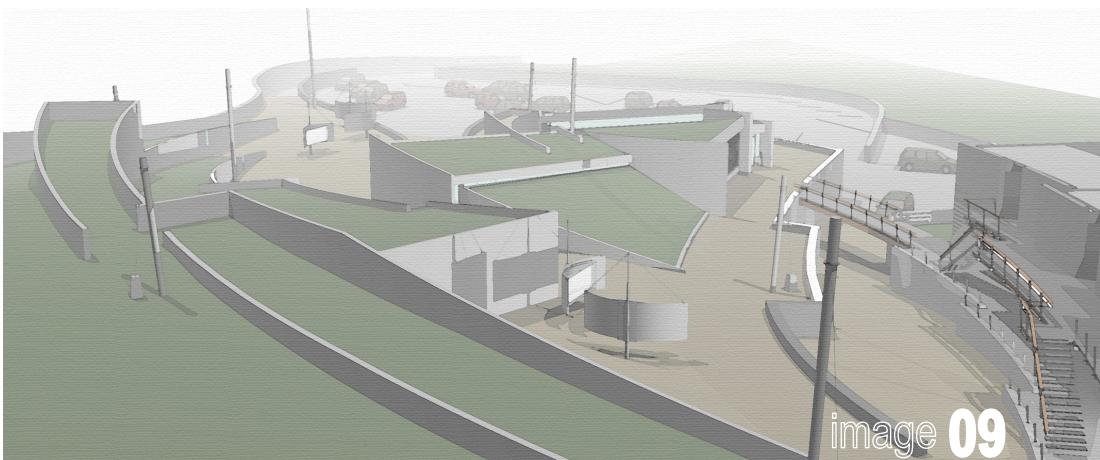
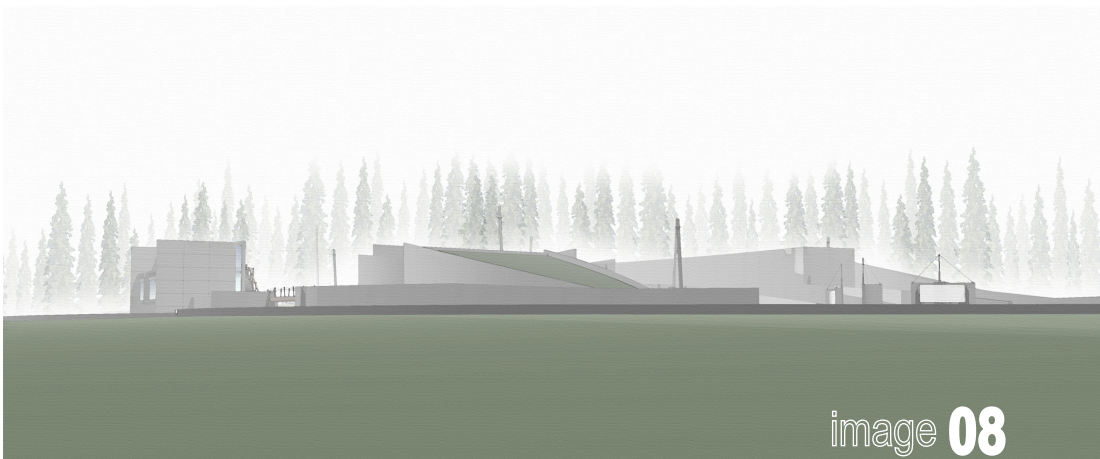
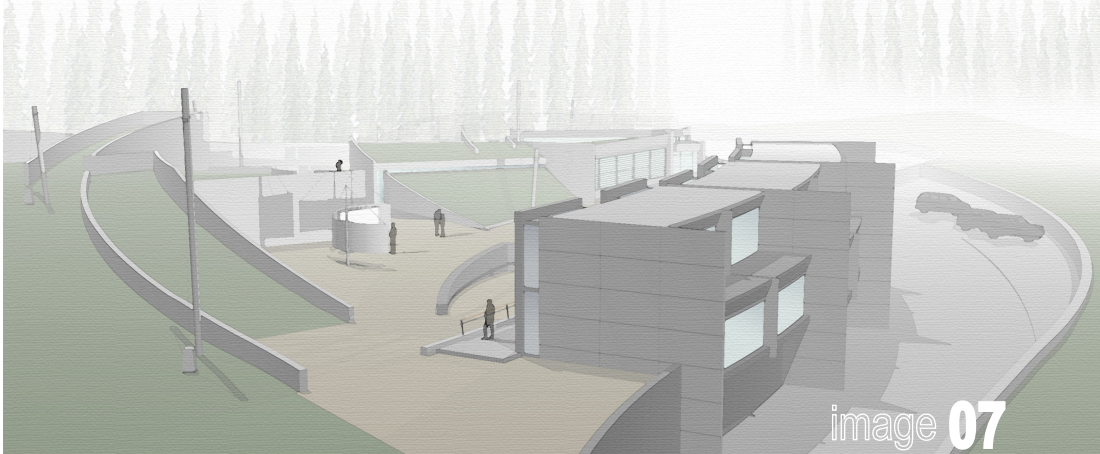
// SITE PERSPECTIVES

All images can be referenced back to the floor plans (pg. 84-85).

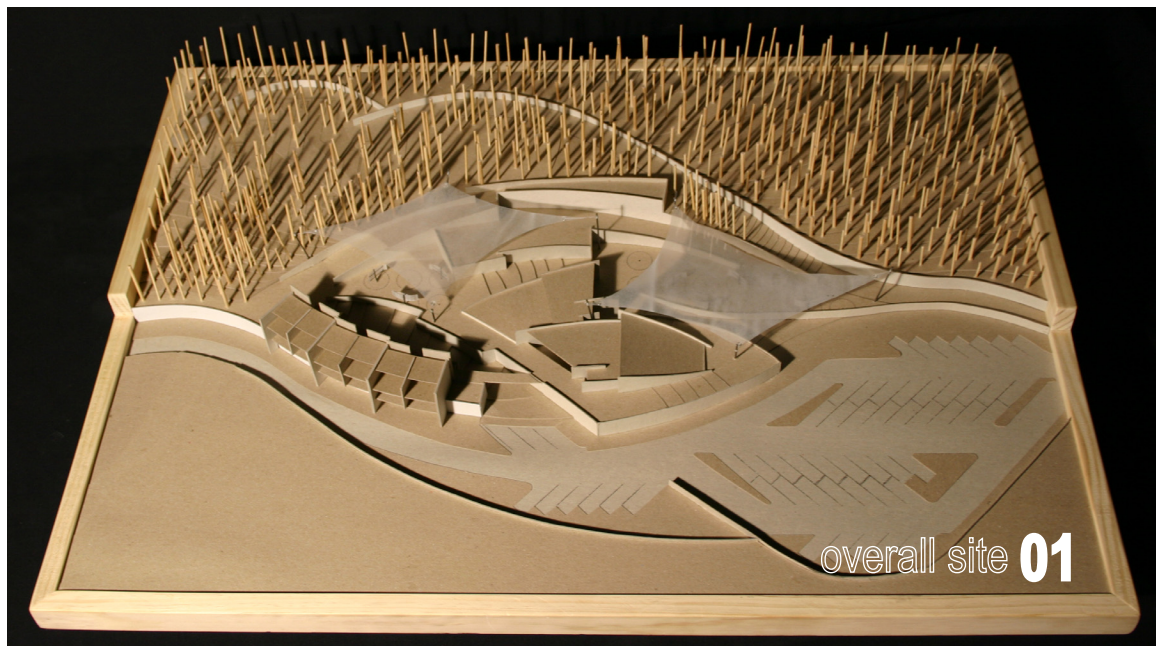


// SITE PERSPECTIVES

All images can be referenced back to the floor plans (pg. 84-85).



// *PHYSICAL MODEL*



// SPRING SEMESTER FOCUS

As stated before, the second semester was a focus on designing a facility that learned from the survival strategies of the permanent residents of the site (i.e. local flora and fauna). The application/translation of the importance of the ground plane, durable skin, and migration were investigated. Surface materials as well as tectonic detail were explored.

UTILIZING THE GROUND PLANE-

As a means of protection, the ground is extremely important for the survival of many plant and animal species. This translated into the overall form of the entire facility. All programmed spaces (with the exception of the labs/studios) rooted themselves into the ground. By building into the ground, the structural stability of the buildings relies heavily on the earth. Strong snow loads could then be dispersed throughout the building and easily transferred to the ground.

DURABLE SKIN-

Both flora and fauna have adapted their outer surface to better sustain nature's changes in the upper altitudes. Translation to the architecture of this facility developed in the tectonic details of the facility. The outer walls of most of the facility were designed as double concrete walls with an intermediate air-space in separating the two walls. These walls allow for greater loading capacity and they also collect the sun's heat and store it for the cool evenings in the spring and summer.

The facility also has the capability to completely close itself down at the end of a season. All openings (doors and windows) have storm coverings that are able to withstand hurricane force winds and intense pressure. These storm coverings can be pulled down when the facility closes for the year and will protect it from the intense weather conditions throughout the winter.

MIGRATION / HIBERNATION-

Each animal/plant of the subalpine ecosystem deals with the onset of winter a bit differently. Some have developed mechanisms that allow them to thrive in winter conditions, while others tend to migrate to lower elevations where conditions are more favorable. The translation towards architecture is evident in several instances:

- 1 - **RV Campground-** the campground allows for researchers and artists to use the facility while its open, however, when the facility closes (or in case of fire) the RV's leave the park.
- 2 - **Canvas-** the canvas covering the outdoor exhibit spaces is taken down at the end of the open season, and is stored on site.
- 3 - **Exhibits-** the outdoor display pieces are adjustable to individual displays, and have the capability to be used or stored throughout the open season. However, when the facility closes for the winter, all display units would be stored on site in designated storage spaces.

*// SPRING SEMESTER FOCUS // CONT.***VIEWING DEVICE-**

The lab/studio building is the only structure that is not integrated into the ground. The building was intended to function as a viewing device looking down the Continental Divide and the bottom of the valley. Visiting artists/researchers would work primarily in the field, although they need a facility where they can come back to and house their equipment and finalize the work done in the field. The structure acts as a place of reflection, primarily facing the Continental Divide and the Kawuneeche Valley. The backside of the labs/studios is primarily solid, emphasizing the view towards the valley since the front of the building is glazed. When the entire facility closes for the winter, the remaining dominant piece becomes the labs/studios, emphasizing the importance of the visiting artists/researchers and their work.

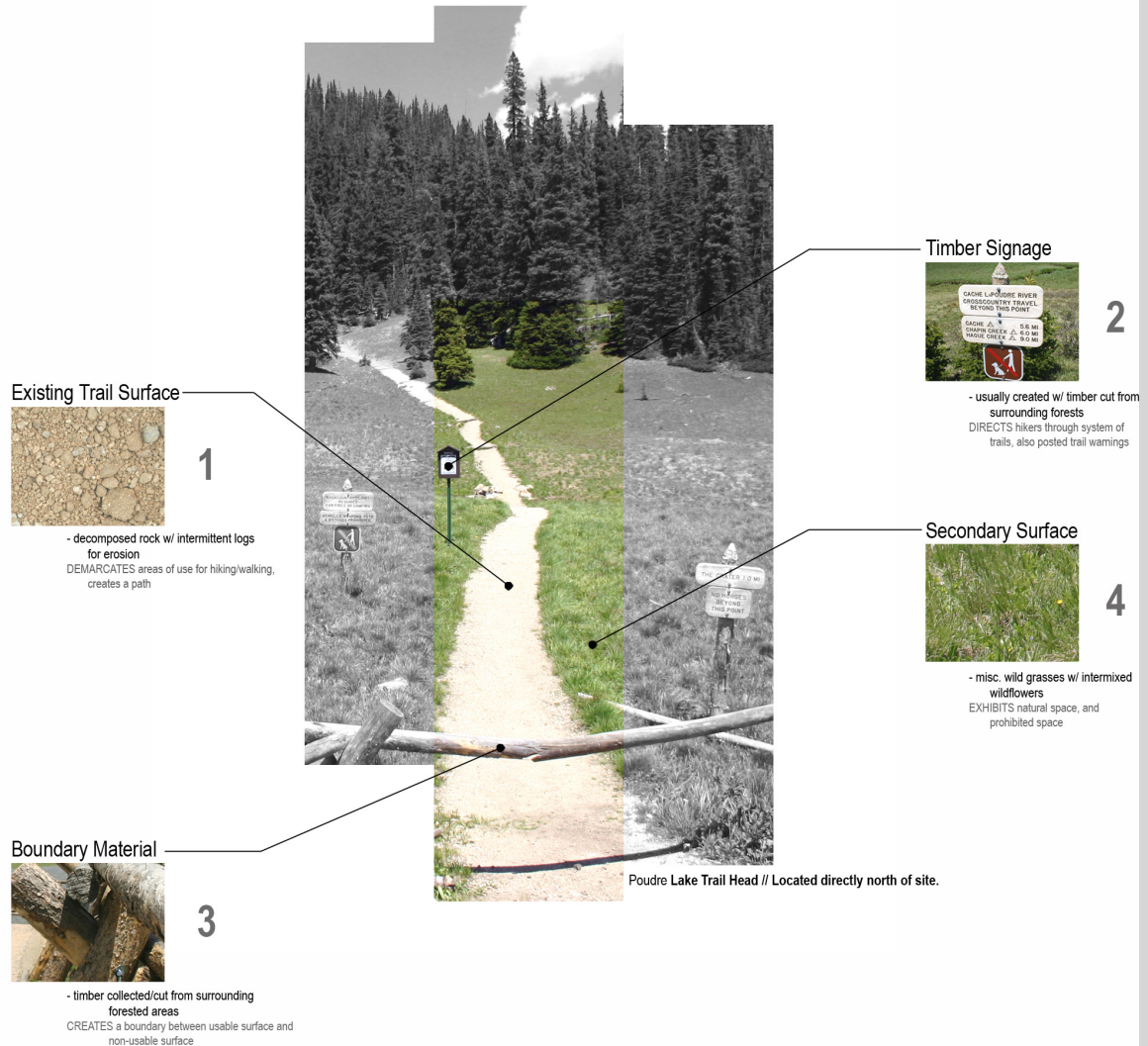
CLOSING-

The main intention of the facility is to offer an educational experience for all visitors that changes from year to year. Many existing nature/interpretive centers do not change their exhibits for years. This facility would offer an ever-changing exhibit. With new researchers and artists coming every year, displays would change and the overall aesthetic of the exhibit spaces would differ as well. This would offer returning visitors with new information every visit. The two disciplines (art and science) would be able to intermix in their presentation and work ethics, creating a facility that can appeal and reach more visitors than a typical nature center.

The overall form and construction of the facility would also be an interpretive experience for visitors. The permanent indoor exhibit space (located next to the bookstore) would explain the tectonics and reasoning of this facility. Visitors would learn about the surrounding ecosystem and its adaptive qualities (survival strategies, pg 81) and how those have been related to the design. In essence, the center itself also becomes a teaching tool.

****THE REMAINING PAGES INCLUDES ADDITIONAL WORK DONE THROUGHOUT THE YEAR THAT WAS NOT IMPERATIVE TO EXPLAINING THE PROJECT, BUT NONETHELESS, STILL IMPORTANT TO THE PROCESS. ****

// SURROUNDING CONTEXT & MATERIAL USAGE



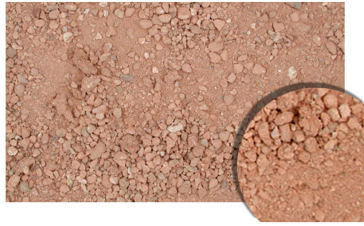
SURROUNDING MATERIALS AND USES

-AS APPLICABLE TO THE PROJECT

The above diagram looks at the material usage for a typical trail within the park. Decomposed rock is primarily the trail material at these elevations. Where the grass is able to grow, it creates a clean line designated the trail. Park visitors are not to walk off the trail, as to not injure the delicate surrounding ecosystem.

// POSSIBLE SITE MATERIALS

DECOMPOSED GRANITE will be used in areas of high-traffic. It's function will be to create a durable walking surface as well as to designate areas of circulation.



Product Name: Adobe Sunset Fines
Description: Warm coral-red hue evokes the crimson sunset at twilight drifting over the desert's horizon.
Size: (3/8") Fines
Color: Coral pink and red
Geology: Rhyolitic in origin
Source: Southwest Boulder & Stone, North County and Indio yards

1a



Product Name: Desert Sand Decomposed Granite
Description: Awash with pale beige and russet tones, this distinctive material conjures up the endless sand dune cliffs of the Tunisian desert.
Size: 3/8" minus decomposed granite
Color: Tan to light brown
Geology: Granitic in origin
Source: Southwest Boulder & Stone, North County, CA and Indio, CA

1b



Product Name: Graphite Gray Fines
Description: Blustery in spirit, this deepest slate gray rock is ashen in color, but full of vitality. A primary component in many gardens.
Size: 3/8" minus fines
Color: Medium gray
Geology: Granitic in origin
Source: Southwest Boulder & Stone, North County and Indio yards

1c

NATURAL GRASSES will be used in areas of light circulation, in most cases it will be applied in areas prohibited to pedestrians.



Surface Name: Grass
Description: mixture of wild grasses intermixed w/ wildflowers throughout span
Geology: native grasses indigenous to the ecosystem
Source: transplant, seeding

4a

TIMBER BARRIERS could be used in order to restrict pedestrians into areas that are closed or dangerous.



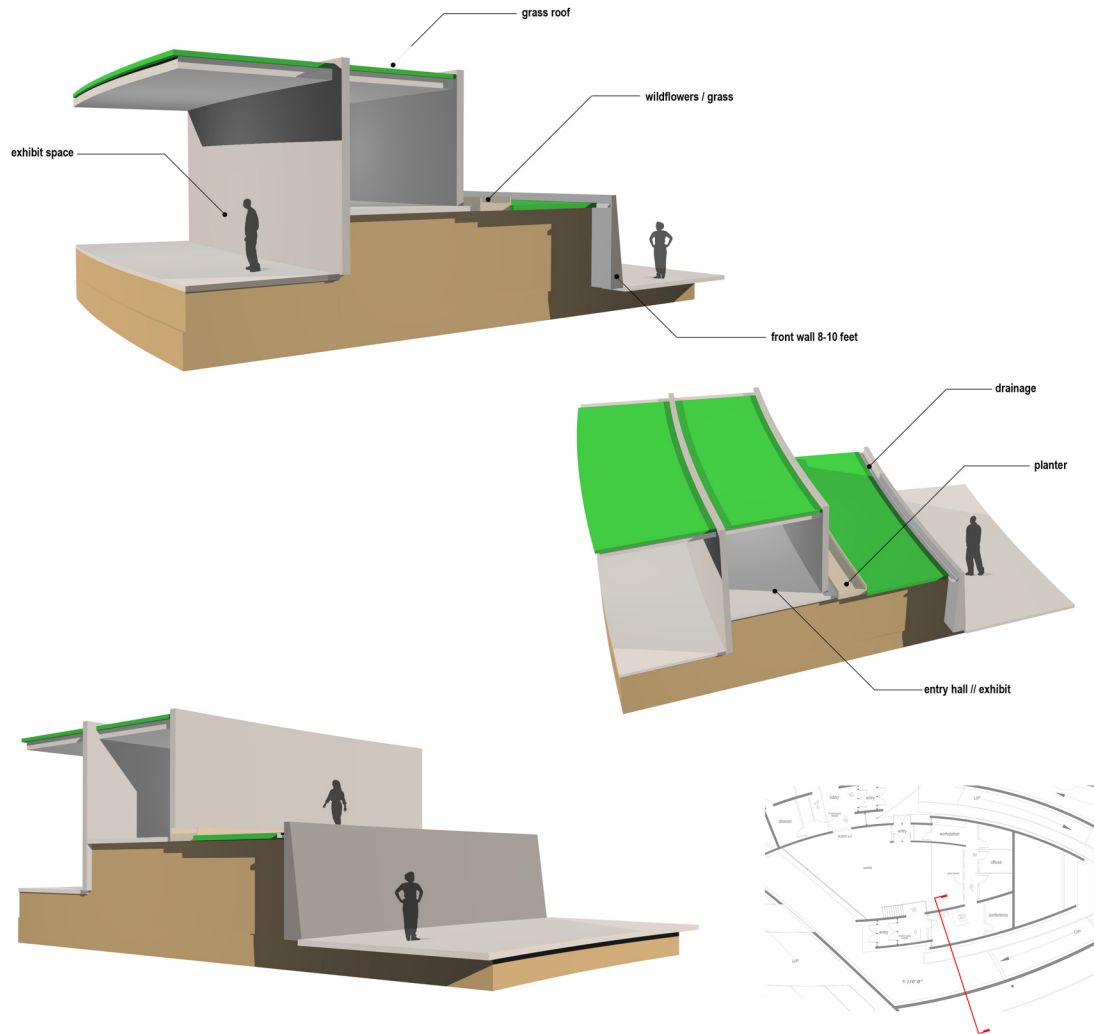
3a

SITE MATERIALS AND SURFACES

-AS APPLICABLE TO THE PROJECT

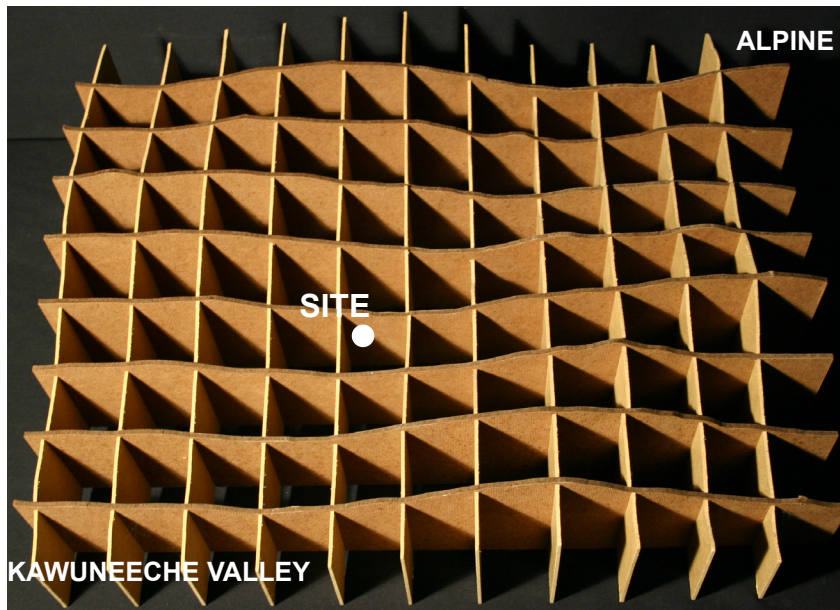
The above material palette was used to visualize the possible surface material types for the exterior spaces within the center.

// FRONT WALL SECTION

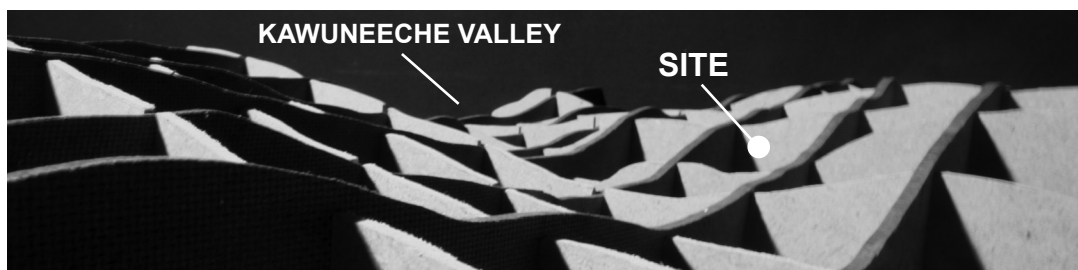
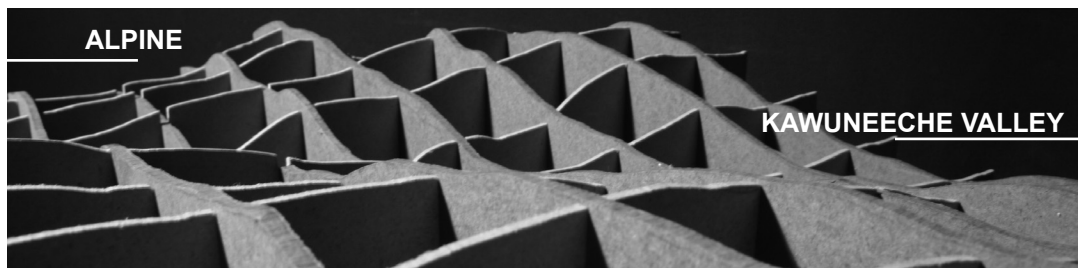


The section was taken in order to understand the relationship of heights between the interpretive center and the parking area. The intention was to allow as little viewing to the parking area as possible. By building up the earth around the parking lot, it allowed for viewing to cross over the parking and into the valley, and vice versa.

// SITE MODEL // 1:400



The model was built in order to express the area surrounding the site. The model covers, roughly, about a mile and a half square. The model shows the continuous level changes the area expresses. It also shows that the actual build site lies at one of the lower points within the valley.



BIBLIOGRAPHY AND ACKNOWLEDGMENTS

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-ACKNOWLEDGMENTS & DEDICATIONS

BOOKS:

- ARMSTRONG, DAVID M., 1987. ROCKY MOUNTAIN MAMMALS. Boulder. Colorado Associated University Press. x + 223 pp.
- EVANS, HOWARD ENSIGN AND EVANS, MARY ALICE. 1991. CACHE LA POUDDRE: A NATURAL HISTORY OF A ROCKY MOUNTAIN RIVER. Niwot, Colorado. University Press of Colorado. 260 pp.
- FISHER, CHRIS, DON PATTIE, TAMARA HARTSON. 2000. MAMMALS OF THE ROCKY MOUNTAINS. Canada, Lone Pine Publishing. 295 pp.
- GELLHORN, JOYCE. SONG OF THE ALPINE: THE ROCKY MOUNTAIN TUNDRA THROUGH THE SEASONS. Boulder, CO. Johnson Printing. x + 260 pp.
- KRICHER, JOHN C./MORRISON, GORDON. 1993. A FIELD GUIDE TO THE ECOLOGY OF WESTERN FORESTS. Houghton Mifflin Company. xvii + 554 pp.
- LYNCH, DENNIS L. 1974. AN ECOSYSTEM GUIDE FOR MOUNTAIN LAND PLANNING LEVEL I. Colorado State Forest Service. Colorado State University. iii + 94 pp.
- TORBIT, STEPHEN C. 1987. LARGE MAMMALS OF THE CENTRAL ROCKIES: A GUIDE TO THEIR LOCATIONS AND ECOLOGY. Fort Collins, CO. Robinson Press. xii + 72 pp.
- WUERETHER, GEORGE. 2001. ROCKY MOUNTAIN: A VISITORS COMPANION. Mechanicsburg, PA. Stackpole Books. V + 266 pp.
- ZWINGER, ANN H. / WILLARD, BEATRICE E. 1972, LAND ABOVE THE TREES: A GUIDE TO AMERICAN ALPINE TUNDRA. NEW YORK/EVANSTON/SAN FRANCISCO/LONDON. HARPER & ROW. XVII + 489.

PERIODICALS:

- DHEERE, JESSICA JOAN. "FOUR VISITOR CENTERS SUBTLY INTERPRET THE LANDSCAPE." *Architectural Record*, 1999. v10, n10: pp 144-149.
- FREIMAN, ZIVA. "THE BRAIN EXCHANGE." *Progressive Architecture*, 1995. v76, n4. pp 76-85.
- HANRAHAN, THOMAS & V.MEYERS. "INTERPRETIVE CENTER." *Architecture + Urbanism*, 1992. July, n7: pp 28-45.
- "ARCHITECTURE DESIGN: INTERPRETIVE CENTER." *Progressive Architecture*. 1989. v70, n1: pp 70-73
- TSIEN, BILLIE & T. WILLIAMS. "THE NEUROSCIENCES INSTITUTE." *GA Document*, 1997. n50. pp 46-61.

B i b l i o g r a p h y

IMAGES:

Pictures Courtesy of: eNature.com and Kurt Cisar

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i would like to thank all members of the faculty that had a part in my development, not only through this project, but my education here at Architecture Hall

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